Friden

MODEL 1217
PRINTING CALCULATOR
ADJUSTMENTS

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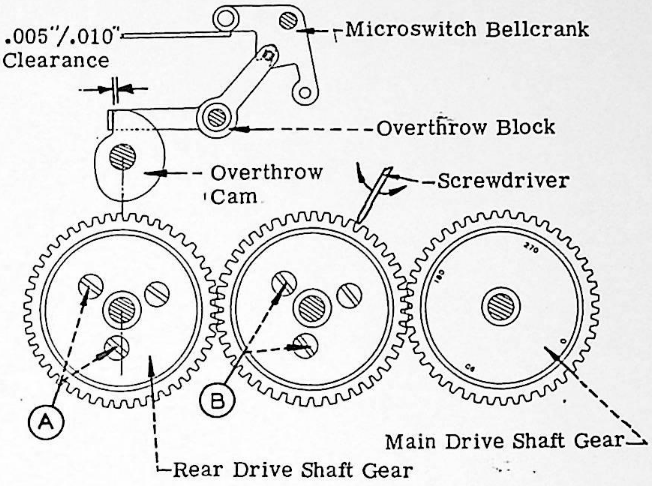
DRIVE SHAFTS TIMING

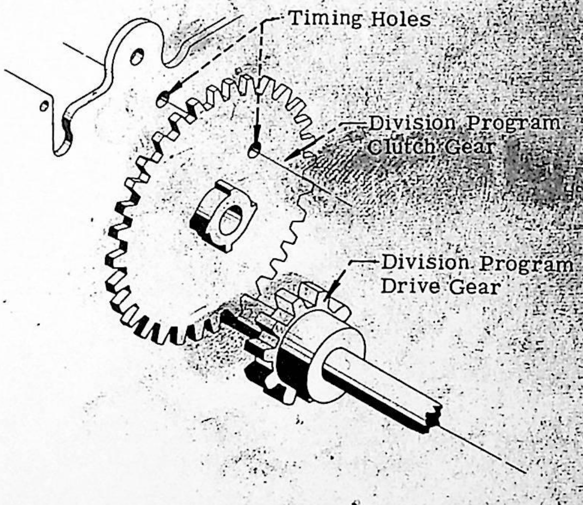
Place machine in home position (0^0) to timing mark on gear frame, loosen (3) lock screws "B". Use wide tip screwdriver between idler gear teeth, twist screwdriver to eliminate backlash in gear mesh, tighten lock screws "B". Loosen lockscrews "A" position rear drive shaft to have .005"/.010" clearance between overthrow cam and overthrow block.

Reason: To insure no time lag or backlash in drive shaft rotation.



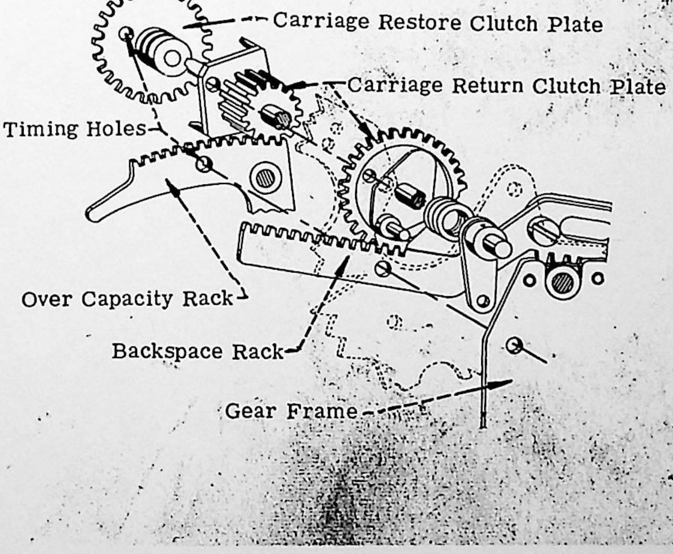
DIVISION PROGRAM CLUTCH TIMING

Remove pin from division drive gear on rear drive shaft, move out of mesh with division clutch gear. With front and rear drive shafts in home position rotate the division clutch gear until one of the four timing holes is lined up with the timing hole in the mult-division frame, move drive gear back into mesh with clutch gear and replace pin.

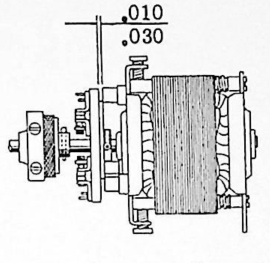


BACKSPACE RACK AND CARRIAGE RETURN

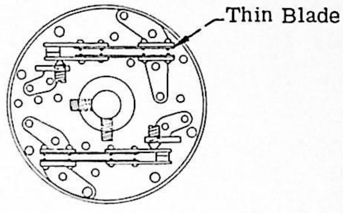
With the mult. and selection carriages in home position, the timing holes in the carriage return clutch plate and the carriage restore clutch plate, and the overcapacity rack, the backspace rack and the gear frame, should be visually aligned as shown.



MOTOR AND MOTOR SPEEDS



Low Speed



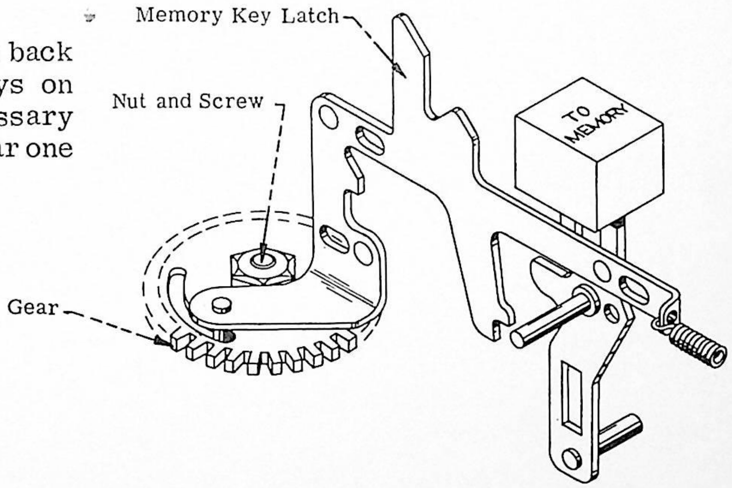
High Speed

Loosen set screws and move governor to allow .010" to .030" of the brushes to show. The motor low speed is 160 drive shaft cycles per minute. Adjust at the low speed governor point adjusting screw. NOTE: One low speed governor blade is thinner than the other blades.

The motor high speed is 235 maximum drive shaft cycles per minute. Adjust at the high speed governor point adjusting screw. The low speed micro switch must be closed with high speed micro switch for testing high speed drive shaft cycles.

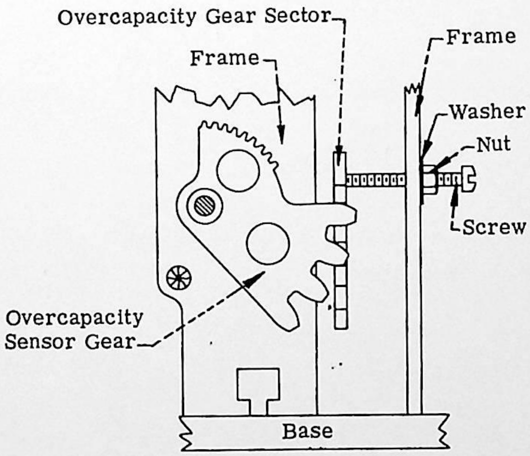
MEMORY KEYS RELEASE

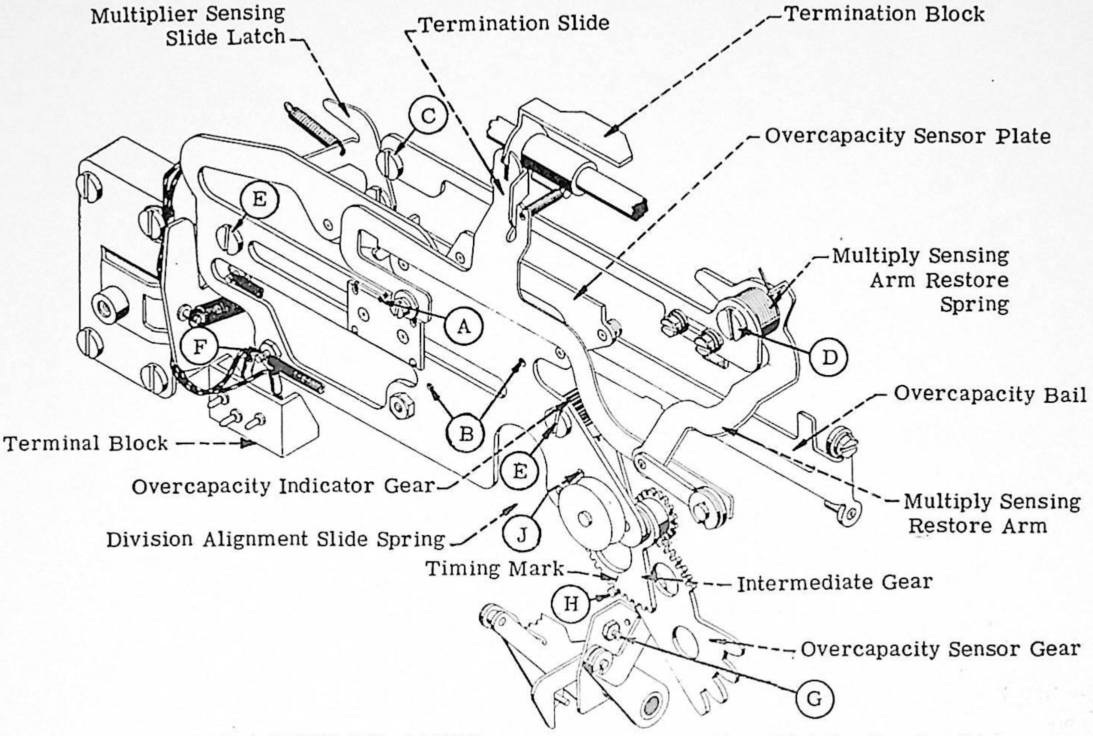
The memory keys latch must be pulled back far enough to release the memory keys on the carriage restore overtravel. If necessary remove the nut and screw and move gear one tooth or more as required.



OVER CAPACITY GEAR SECTOR ENGAGEMENT

Place machine in home position (0), selection unit in home position. The upper tooth of over capacity gear sector to engage over the upper tooth of over capacity sensor gear. Turn back up screw to obtain a good engagement with a minimum of backlash in gear mesh. Escape selection unit one order at a time to 16th order; checking each order for gears not binding. Re-adjust for any order that binds. Tighten lock nut.




Multiplier Sensing Slide Latch
Termination Slide
Termination Block
Overcapacity Sensor Plate
Multiply Sensing Arm Restore Spring
Overcapacity Bail
Multiply Sensing Restore Arm
Intermediate Gear
Overcapacity Sensor Gear
Rear Division Sensing Link
Terminal Block
Overcapacity Indicator Gear
Division Alignment Slide Spring
Timing Mark
A
B
C
D
E
E
F
G
H
J

REMOVING THE ACCUMULATOR

1. Have machine in home position (0^0) and the selection unit in home position. Remove terminal block.

2. Remove the long, division alignment slide spring.

3. Line up notches (A) and end of upper rack. Install two (2021) screws in holes (B) to maintain timing. End of lower rack must line up with center of hole(J.)

4. Remove the clip from the multiplier sensing restore arm. Relieve the tension on the multiplier sensing arm restore spring Use a rubber band to hold the multiplier sensing restore arm out of the way.

5. Remove the spring from the termination slide to the termination block.

6. Remove the wire clip from behind the overcapacity indicator gear, push the gear back out of mesh with the intermediate gear.

7. Remove mounting screws (C) and (D). Remove two mounting screws (E) and one screw stud (F), remove the mounting plate, racks etc. from the machine.

8. Remove the overcapacity sensor plate from the overcapacity bail, note the bail has a notch near the left end to permit removal of the plate.

9. Remove the clip and slip the rear division sensing link off the stud.

10. Loosen the lock nut (G) and back the screw out, even with the frame.

11. Remove two screws holding accumulator to base.

12. Remove a screw and a screw stud from the top of the rear accumulator frame.

13. Slide the accumulator rearward, and out of the machine. Hold the 17th order termination link up to clear the accumulator frame.

INSTALLING THE ACCUMULATOR

1. Have machine in home position (0°) and the selection unit carriage in home position.

2. Guide the accumulator into slots in the base plate. The fork of the negative zero block must engage the stud on the division overstroke bellcrank. The fork of the transfer control cam follower must engage the roller on the upper transfer restore bail. Lift the 17th order termination link to clear the accumulator rear frame. The studs on the accumulator side frames are to seat firmly in the slots in the left and right inner frames. (see Adj. 41).

3. Install a screw and a screw stud in the rear accumulator frame.

4. Install two accumulator base screws.

5. Re-adjust 17th order termination link retainer screw (G) (see Adj. 42).

6. Put rear division sensing link back on stud and replace clip.

7. Replace the overcapacity sensor plate on the overcapacity bail, note the notch near the left end of the bail is to permit assembly of the plate.

8. Replace the mounting place, rack etc.

   Note: The timing mark on the intermediate gear must be aligned with the center of the mounting stud (H) for the overcapacity sensor gear. The stud on the overcapacity gear slide must engage the slot in the overcapacity sensor plate. The slot in the termination slide must engage the termination block. The multiplier sensing slide latch pivots on a stud on the mounting plate. Fasten the mounting plate with two screws (E) and a screw stud (F).

9. Put the Overcapacity Indicator gear back into mesh with the intermediate gear and the selection carriage sensor rack. Replace wire clip.

10. Replace the spring from the termination block to the termination drive slide.

11. Replace the overcapacity mounting plate and two mounting screws (C) and (D).

12. Remove the rubber band from the multiplier sensor restore arm. Hook up the multiplier sensor restore arm (torsion) spring. Re-assembly the multiplier sensor restore arm to the termination latch drive slide and replace the snap washer.

13. Remove two timing screws (B).

14. Replace the long, division alignment slide spring.

15. Test machine.

ADJ. 1 FRONT PENDANT ALIGNMENT

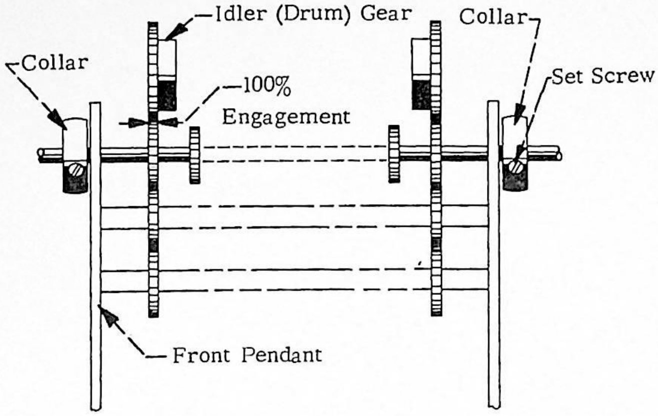


FIG. 1 PENDANT - IDLER GEAR ALIGNMENT

With the machine in home position loosen collars and move pendant to obtain as close to 100% lateral engagement of pendant gears and idler (drum) gears as possible. This adjustment must be made with the print wheels in the machine.

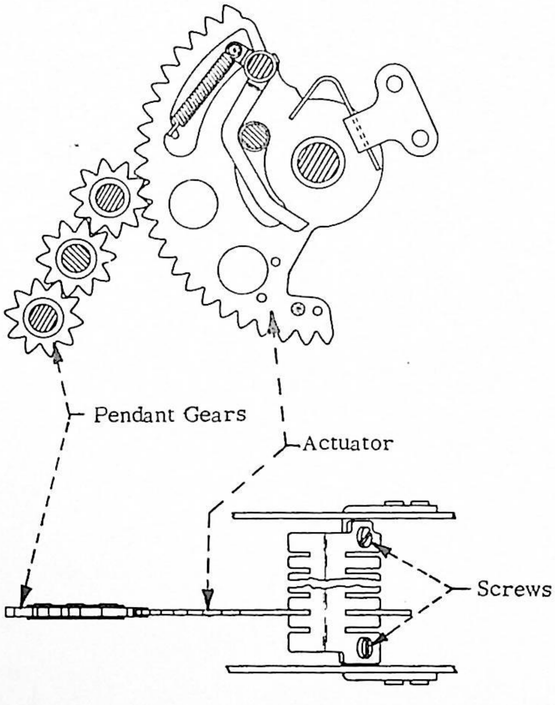
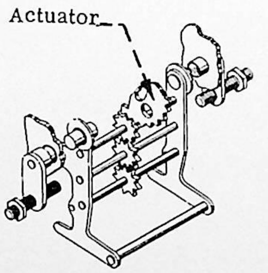


FIG. 2 FRONT PENDANT - ACTUATOR ALIGNMENT

Loosen screws and move the actuator comb right or left to approximately center the actuators with the front pendant gears. Actuators must have 100% engagement with the front pendant gears thru full stroke.

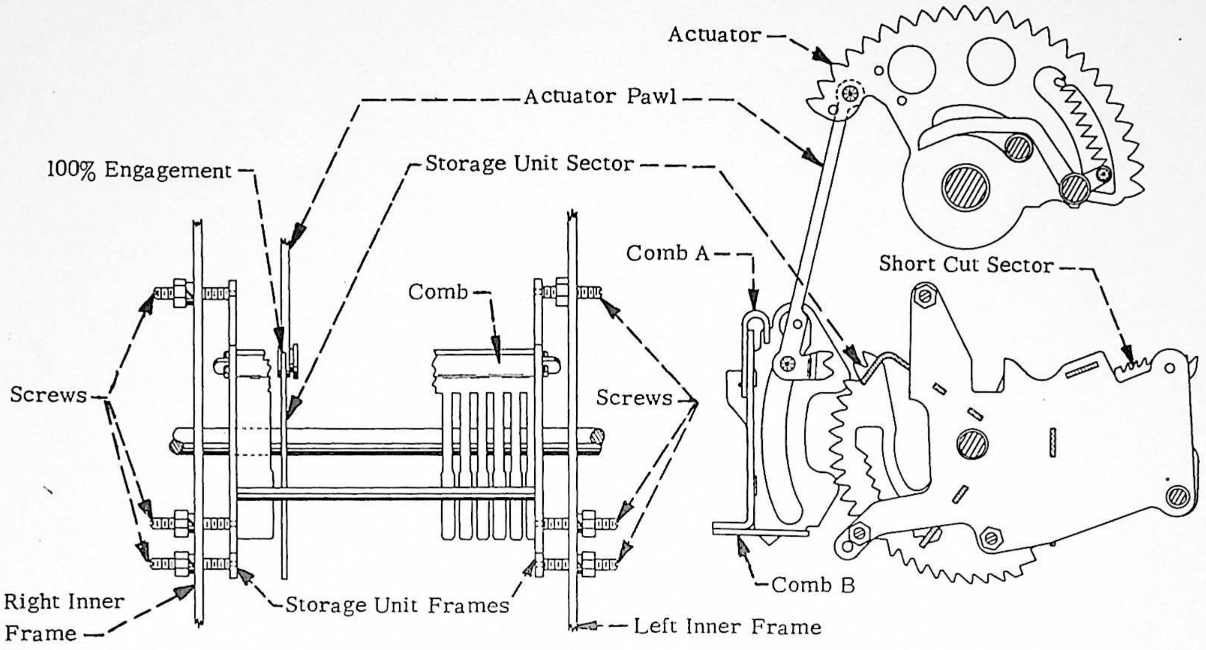
To test individual actuators for freedom of movement: With no selection release clutch and cycle machine to 260°. With a spring hook push each actuator to zero stop and release. Actuator should freely return to actuator drive shaft.

ADJ. 2 ACTUATOR - REAR PENDANT ALIGNMENT



Loosen lock nuts, adjust screws to obtain 100% engagement between pendant gears and actuators. Allow .005" side play.

ADJ. 3 STORAGE UNIT SECTORS ENGAGEMENT WITH ACTUATOR PAWLS



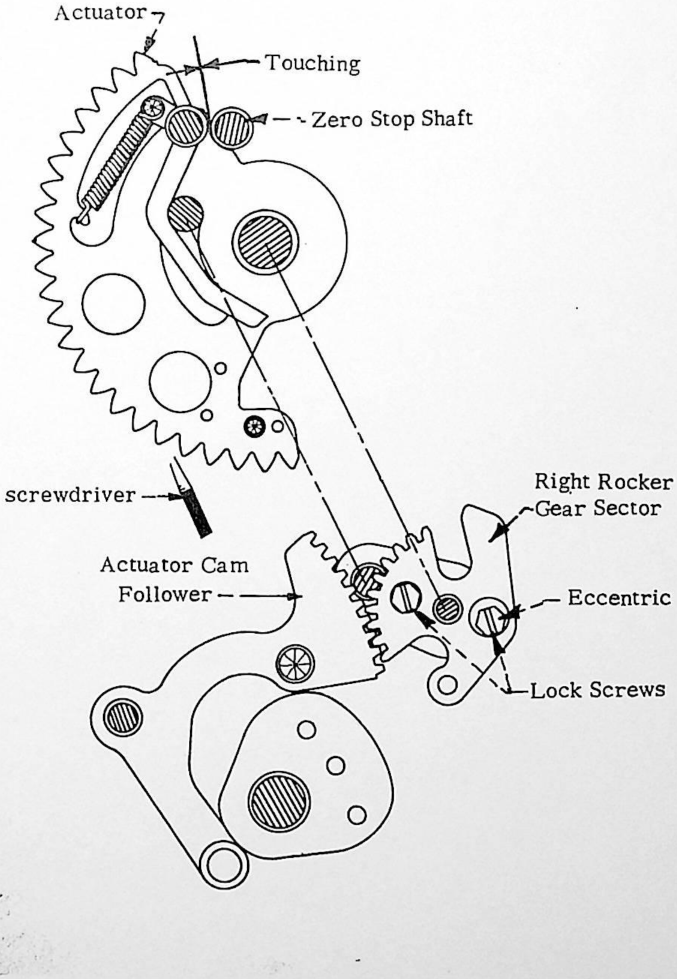
Loosen screws and adjust combs A and B so that the guide plates are parallel to the sides of the lifter bail.

Loosen six lock nuts. Adjust six screws in or out to achieve 100% engagement of storage unit sectors with actuator pawls. Storage unit to have no side play. Storage unit frames to be parallel to inner frames. Caution: Do not compress storage unit frames. Tighten six lock nuts.

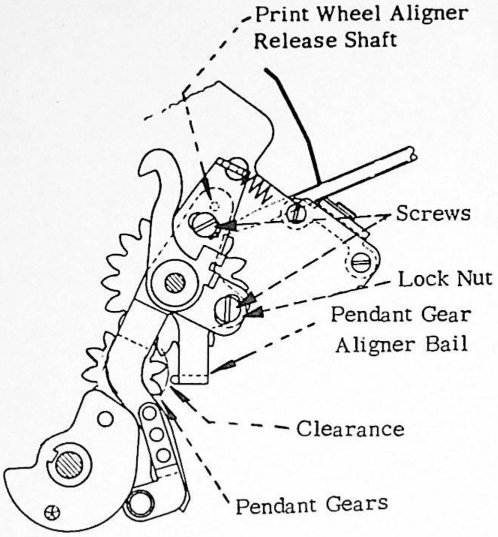
On later machines storage unit will be fixed between inner frames and the six adjusting screws removed.

ADJ. 4 ACTUATOR STOP

Place machine in home position (0°). Loosen lock screws, turn eccentric to have actuators touching zero stop shaft. Do not force eccentric. Tighten lock screws. Push on each actuator with screwdriver as shown, to check adjustment. 005" play permissable.



ADJ. 5 PENDANT GEAR ALIGNER BAIL

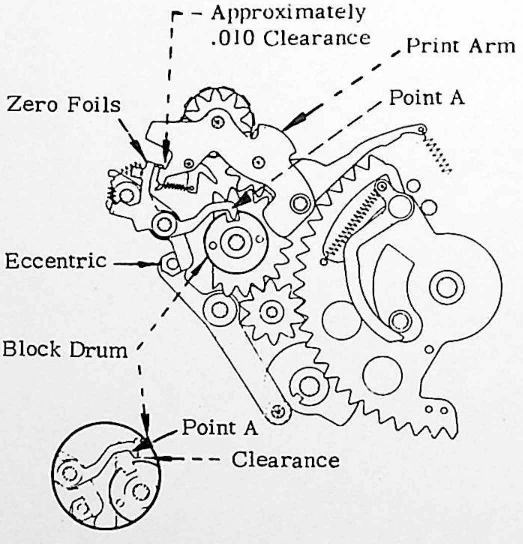


Release front pendant by lifting front pendant control link. Release clutch and cycle to print position. All 17 actuators will rotate to nine stop, and pendant gear aligner bail will go into the pendant gears. Loosen screws enough to allow parts to slip. Push pendant gear aligner bail as far as possible into pendant gears. Slowly turn drive shaft until actuators start back to zero position. When first row of pendant gear teeth go past aligner bail, they should clear with a minimum of clearance. Adjust at this point, tighten screws.

Select all "9"s, depress add key and operate machine by hand. Print wheel aligners should not flicker as print wheels rotate, if they do, it may mean the pendant gear aligner bail is too close to the gear teeth.

Reason: To insure sufficient clearance between the pendant gear aligner bail and gear teeth and proper engagement during printing.

ADJ. 6 ZERO FOILS



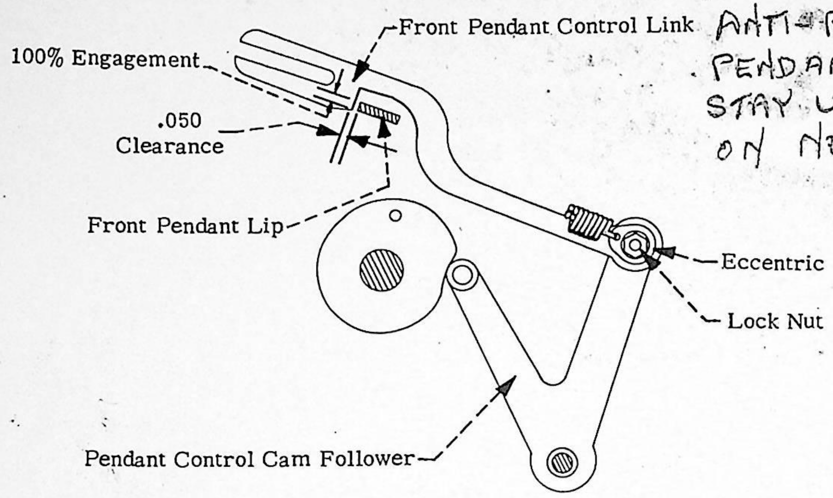
With no selection, release clutch and rotate drive shaft until the first two print arms are released. Rotate eccentric until the lips of the remaining zero foils back out to provide approximately .010" clearance as shown.

With a selection in all orders, release clutch and operate machine by hand. The zero foils should not flicker at the beginning of the actuator downward stroke and all numeral print wheels should rotate. Zero foils should be formed as far to the left as possible, to insure full engagement with block drums.

Reason: To insure the proper engagement of point A with the block drum, since point A cannot be seen the engagement of the lip and the print lever serves as a visable check. If point A does not pull out of the drum the downward stroke of the actuator will be blocked in that order. If point A is not pulling out far enough, as indicated by a flicker at the beginning of the actuator stroke, the drum may become worn at the edge of the notch, which would allow the zero foil to block the print lever on a "1" selection.

ADJ. 7 FRONT PENDANT CONTROL

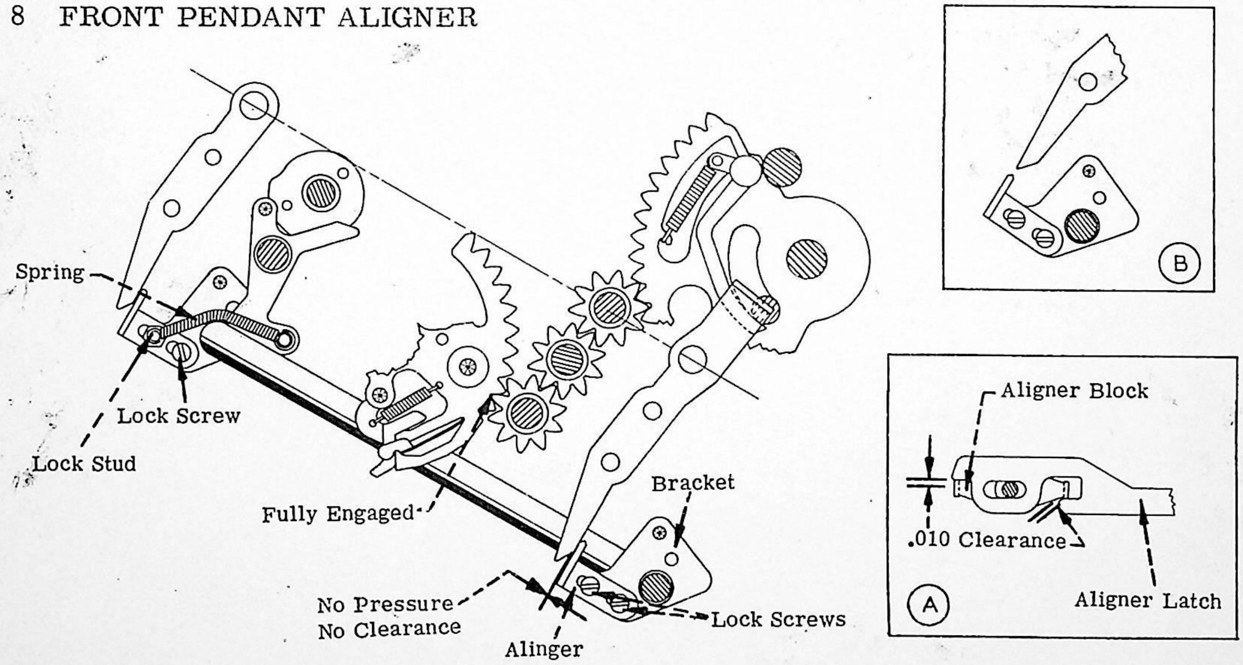
CHECK CLEARANCE BETWEEN FRONT PENDANT CONTROL ARM AND ANTI-REBOUND PAWL STUD. IF FRONT PENDANT ARM RUBS ON IT, IT WILL STAY UP RESULTING IN ALL NINES ON NEXT OPERATION.



Place machine in home position (0°), loosen lock nut, turn eccentric to obtain a clearance approximately .050" between front pendant control link and front pendant control arm lip.

In home position there must be at least 100% engagement between front pendant lip and front pendant control link. Adjust by forming front pendant lip if necessary.

ADJ. 8 FRONT PENDANT ALIGNER



Select twelve numbers in selection unit, depress add key, cycle machine to 60°. Loosen lock screws and lock stud, adjust by sliding both aligners to hold front pendant fully engaged with selection sectors. Tighten lock screws and lock stud, cycle machine to complete add cycle. Depress total key, cycle machine to 5°. If needed form aligner block ears to have approximately .010" clearance of aligner latch, Inset A, to insure blocking on total and from memory operations, cycle machine to complete total cycle. Pendant carriers must clear the aligners on both sides in total at 5°, Inset B.

9 STORAGE UNIT AND SELECTION DIAL RESTORE

Note

4910	.250	(Black)
4911	.260	(Metal)
4912	.270	(Copper)
4913	.281	(Cadmium)

NOTE-#4103 CAN BE GROUND TO SUIT- IT IS TOO THICK TO GET CLIP OFF.

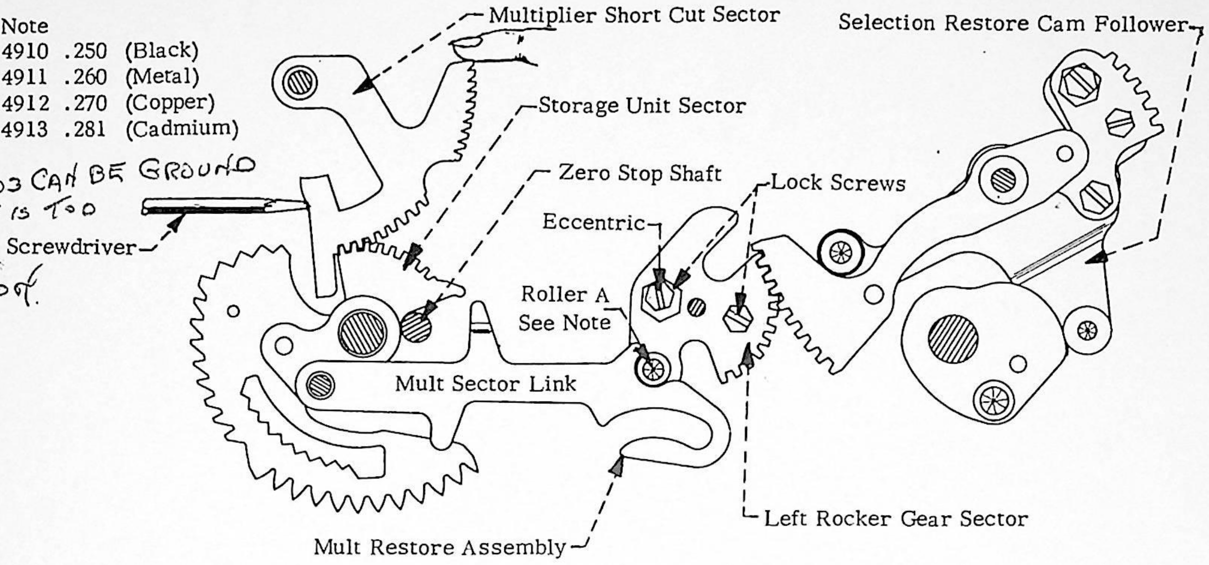


FIG. 1 STORAGE UNIT SECTORS RESTORE

Storage unit sectors are to be restored against zero stop shaft with no clearance.

Place machine in home position (0°). Loosen lock screws. Use smallest (.250-black) roller for roller A. Depress non-add key, manually raise mult sector link and hold engaged. Cycle machine to 158°. Turn eccentric to position storage unit sectors against zero stop shaft, do not force eccentric, tighten lock screws.

With machine still at 158° test each storage unit sector with screwdriver as shown, .005" play permissable.

If additional adjustment is required later, to compensate for wear, roller A can be replaced with one of the larger rollers from the list instead of adjusting the eccentric.

NOTE:

If adjustment cannot be made with eccentric it may be necessary to change timing of gears one tooth and re-adjust eccentric.

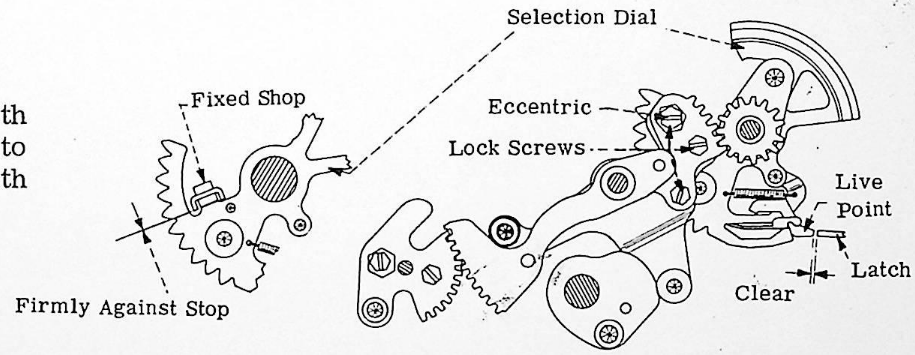
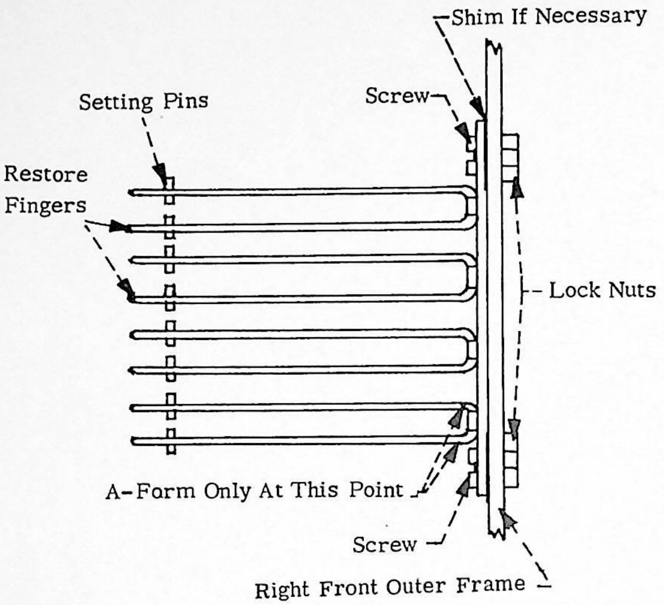


FIG. 2 SELECTION DIAL RESTORE

Selection dials to be driven firmly against fixed stop and live points to have sufficient overtravel to insure latching.

Place machine in home position (0°), loosen lock screws, select twelve numbers in selection unit, depress total key, cycle machine to 158°. Turn eccentric to position selection dials firmly against fixed stop and live points to clear latches. Tighten lock screws, cycle machine to complete total operation.

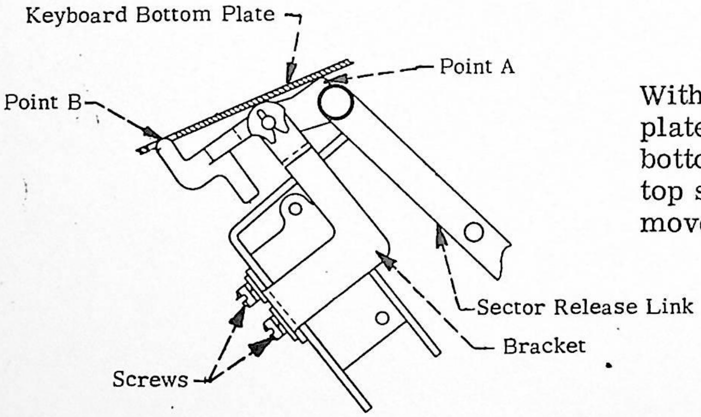
ADJ. 10 RESTORE FINGERS



Loosen lock nuts slightly and move bracket to a position where there is little or no rubbing against the setting pins or the pin board bottom plate for the full width of the carriage. It may be necessary to adjust individual fingers by forming at "A".

Add shims if necessary for full restore of setting pins, see Adj. 27, FIG. 2.

ADJ. 11 RELEASE LINK LIMIT



With point "A" limited against the bottom plate, point "B" should not be below the bottom plate or more than 1/32" above the top surface. To adjust, loosen two screws and move bracket.

ADJ. 12 CARRIAGE ALIGNMENT

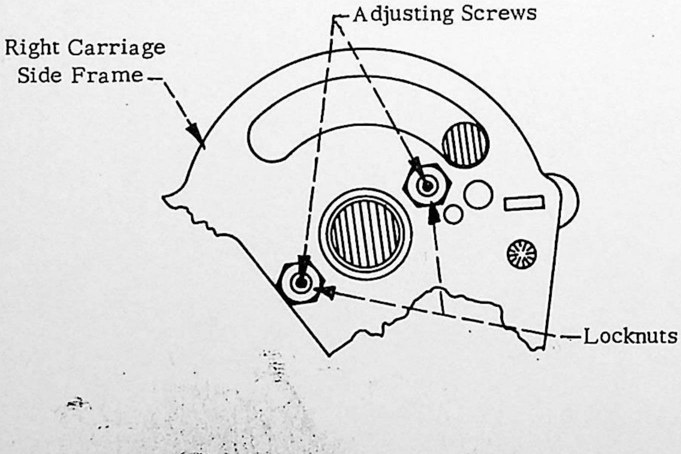
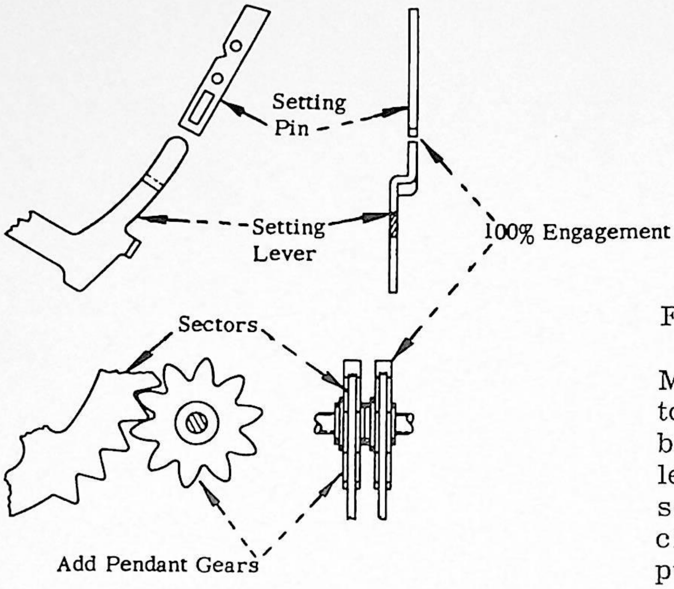


FIG. 1 SECTOR SIDE PLAY

Loosen locknuts and adjust screws for minimum side play of sectors.

Check: Select 12-8's. Each sector must be free to rotate. Each live-point must have 100% engagement with #8 setting pin.

ADJ. 12 CARRIAGE ALIGNMENT (Cont.)



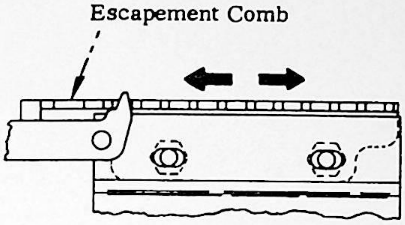


FIG. 2 ESCAPEMENT COMB

Move the escapement comb right or left to provide approximately 100% engagement between the setting pins and the setting levers, and full engagement between the sectors and the pendant gears. If not recheck Adjustment 1 and 2. Keep the comb pushed down as far as possible when adjusting or difficulty may be experienced with escapement. Check in all carriage positions. Recheck Adjustments 27 and 63.

ADJ. 13 ZERO ESCAPEMENT

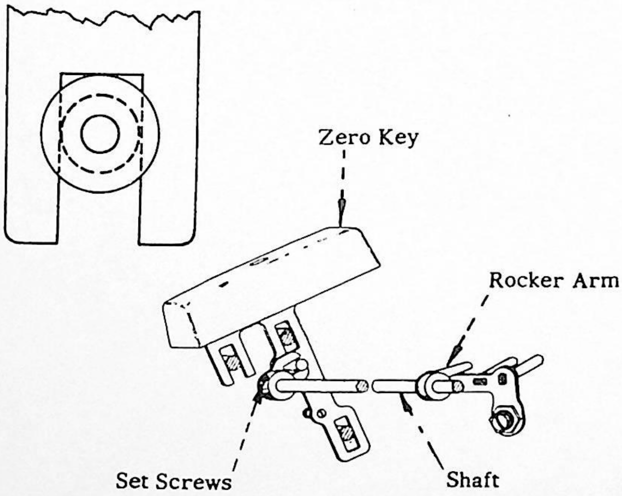


FIG. 1 ZERO KEY

Select one number in selection unit. With set screws loose enough to allow slippage, hold zero key in position where tops of slots are even with tops of key guides. Press rocker arm down as far as possible, tighten screws.

Reason: To allow sufficient overstroke to insure an escapement when zero key is depressed.

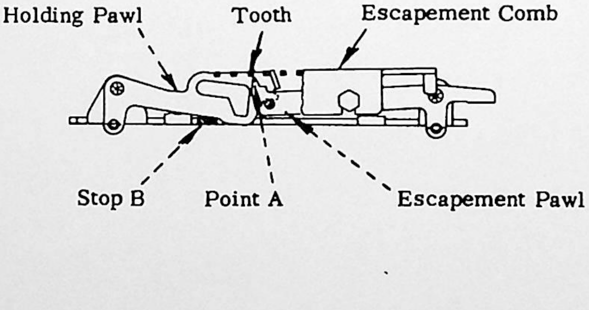


FIG. 2 ESCAPEMENT PAWL STOP

Select one number in selection unit. Slowly depress the zero key. As point A of the escapement pawl clears a tooth of the comb the holding pawl must contact stop B. Form stop B to adjust. Stop B should not be so low that the holding pawl can get under a comb tooth. Check in all carriage positions.

ADJ. 13 ZERO ESCAPEMENT (Cont.)

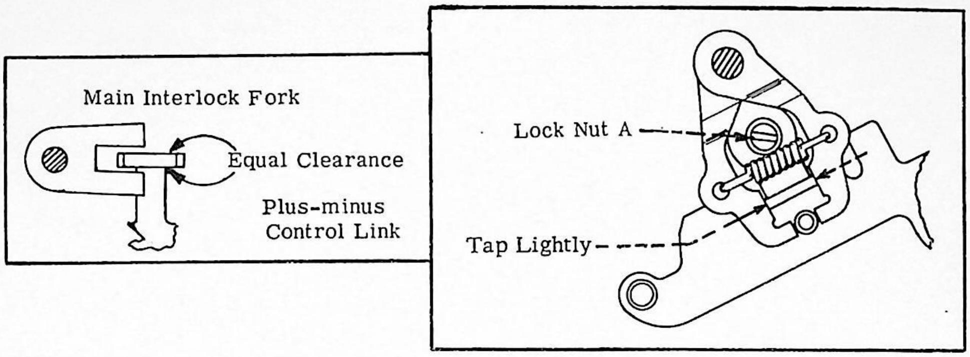
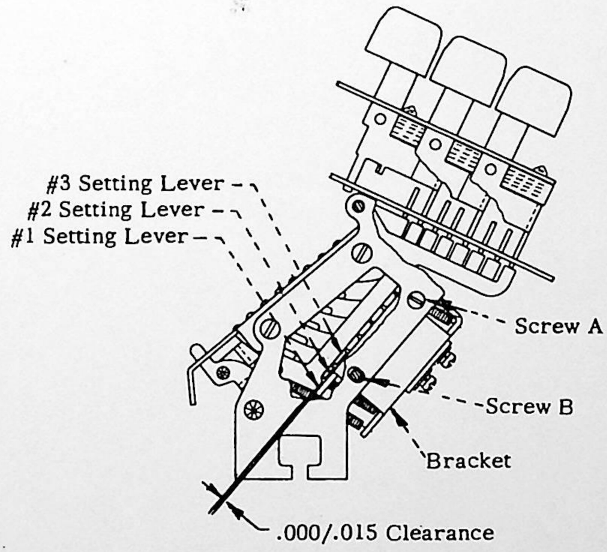


FIG. 3 MAIN INTERLOCK SLIDE CENTRALIZER

Place machine in home position, depress minus key, loosen lock nut A tap lightly to obtain equal between ear of plus-minus control link and main interlock fork.

ADJ. 14 REMOVAL OF KEYSTEM MOTION

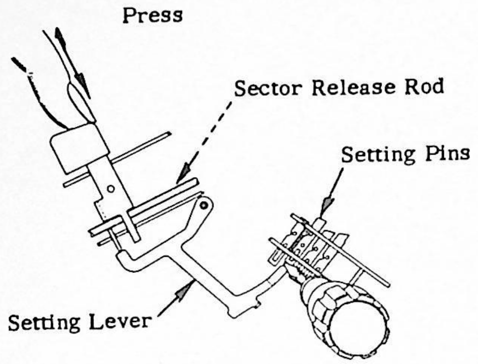


Loosen screws A and B, move the bracket to obtain a clearance .000" to .015" between the bracket and the 1, 2 and 3 setting levers. The greater the clearance, the heavier the key touch will be.

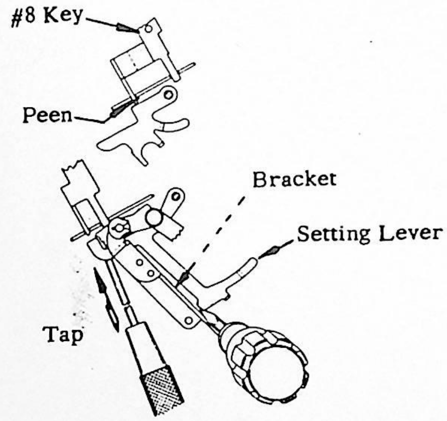
Reason: To reduce the variation in height of keytops in their restored position.

ADJ. 15 SELECTION

NOTE: The following adjustments (Figures 1, 2 and 3) must be made simultaneously since a change in one will affect the others. The sequence in selection must always be: pin set, sector release, carriage escapement.



SHORTENING SETTING LEVERS



LENGTHENING SETTING LEVERS

FIG. 1 SETTING LEVERS

The setting pin should snap into place and be detented by the spring before the selection key is fully depressed. Adjust by lengthening or shortening the setting levers.

To shorten a setting lever: place a screwdriver between the setting lever and the setting pin and press down on the selection key.

To lengthen a setting lever: (#1 thru #4 place a screwdriver, or suitable block, between the setting lever and the bracket, then tap on the setting lever with a punch as illustrated. (#5 thru #8) lengthen the selection key by peening the lower end where it contacts the setting lever, since the setting levers are too short to form.

Reason: So pin will be set at proper time and be fully detented, if the pin is not fully detented it may be released during repeat add. If a setting lever is too long it may not be fully restored when the carriage escapes and catch on a setting pin in the next order.

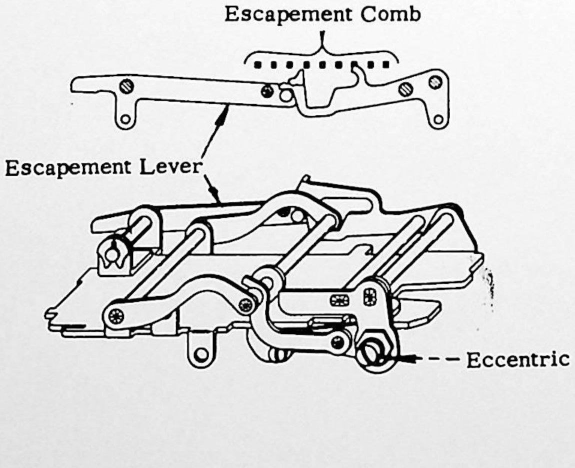


FIG. 2 CARRIAGE ESCAPEMENT

The carriage escapement is to occur near the bottom of the selection key stroke after the sector has been released. Adjust at eccentric. Test each key in all carriage positions.

ADJ. 15 SELECTION (Con't)

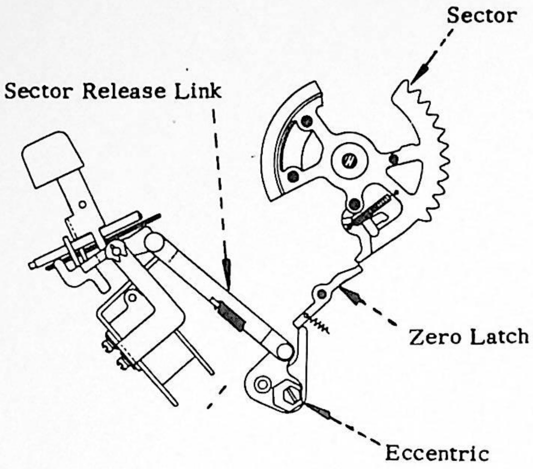
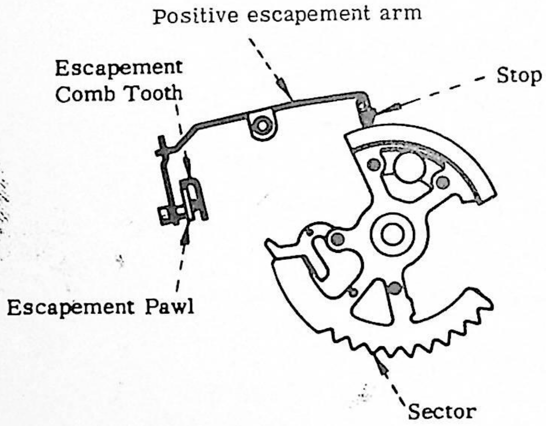


FIG. 3 SECTOR RELEASE

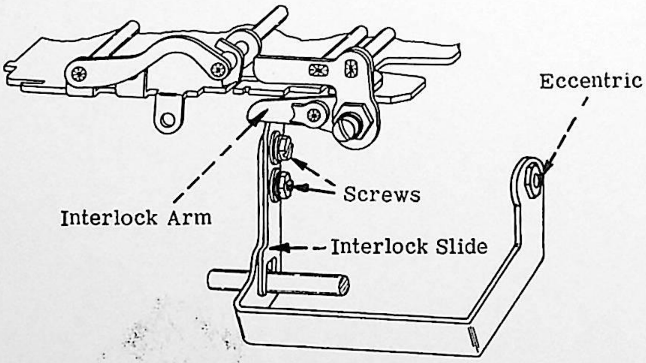
The sectors are to release just before the escapement pawl releases comb. Adjust at the eccentric keep the lobe forward and up.

ADJ. 16 POSITIVE ESCAPEMENT ARM



With the carriage in home position, slowly depress a selection key, the pin will be set and the sector will be released. As the sector begins to rotate it should contact the beveled surface of the nylon stop rocking it up, the front end of the positive escapement arm should push the escapement pawl down, allowing the carriage to move against the holding pawl. Check in all orders. With a selection in all orders manually push the carriage to the right, the tooth of the escapement pawl should be held below the comb. Adjust by bending the front end of the positive escapement arm.

ADJ. 17 KEYBOARD INTERLOCK

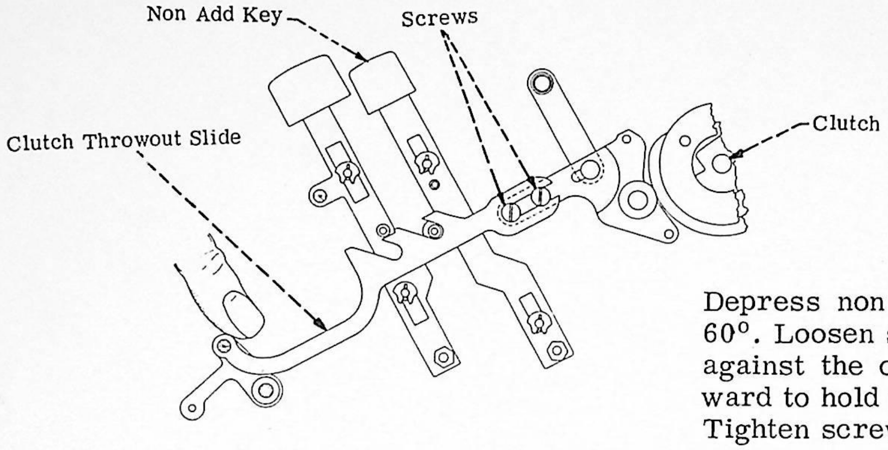


Hold down add key. Loosen screws and raise the keyboard interlock. With machine in home position the interlock must pass freely under the arm with a minimum of clearance.

Hold down on a selection key, rotate eccentric to obtain minimum clearance between interlock slide and keyboard interlock arm.

Check by selecting several numbers, interlock should not move.

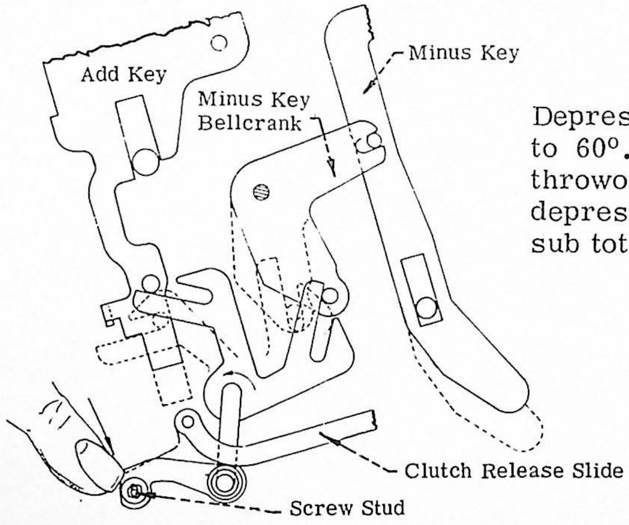
ADJ.18 RIGHT CLUTCH THROWOUT SLIDE



Depress non add key and cycle machine to 60°. Loosen screws, hold the clutch dog latch against the clutch, pull throwout slide forward to hold the non add key fully depressed. Tighten screws.

Check for clearance between key studs and slide in home position.

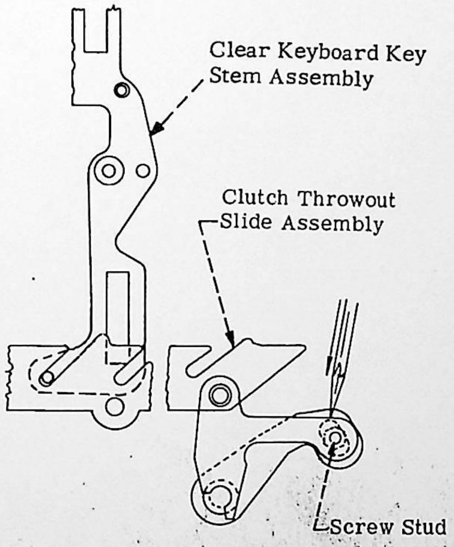
ADJ. 19 CLUTCH THROWOUT SHAFT



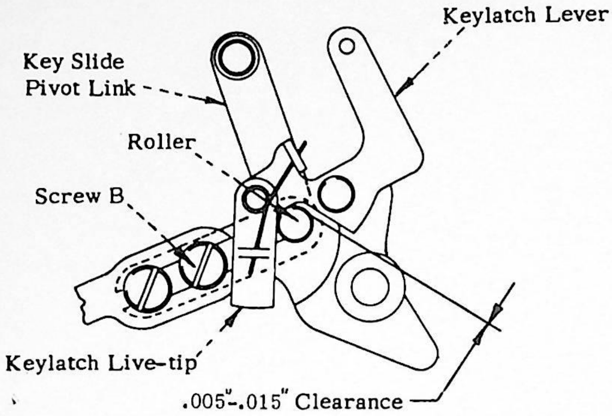
Depress the add key and cycle the machine to 60°. Loosen the screw stud and press the throwout fork lever down to hold the key fully depressed. Check using the minus, total and sub total keys.

ADJ. 20 LEFT CLUTCH THROWOUT SLIDE

Select one number in the selection unit. Depress the backspace key and cycle the machine to 60°. Loosen the screw stud and pull the clutch throwout slide forward, as shown, to hold the key fully depressed.


Clear Keyboard Key Stem Assembly
Clutch Throwout Slide Assembly
Screw Stud

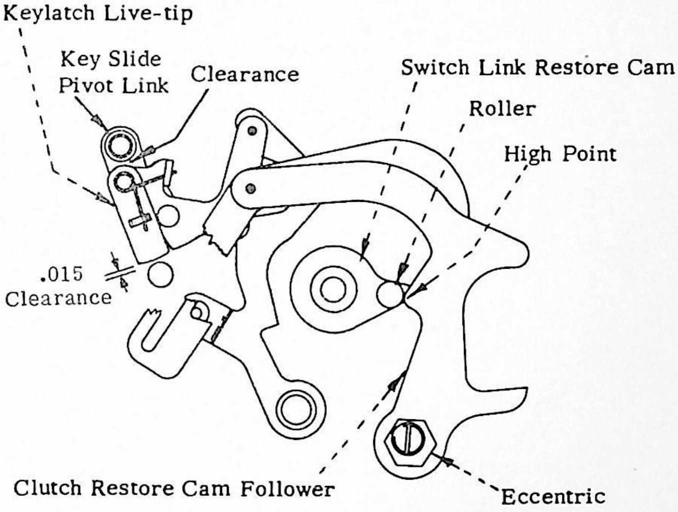
ADJ. 21 KEYLATCH



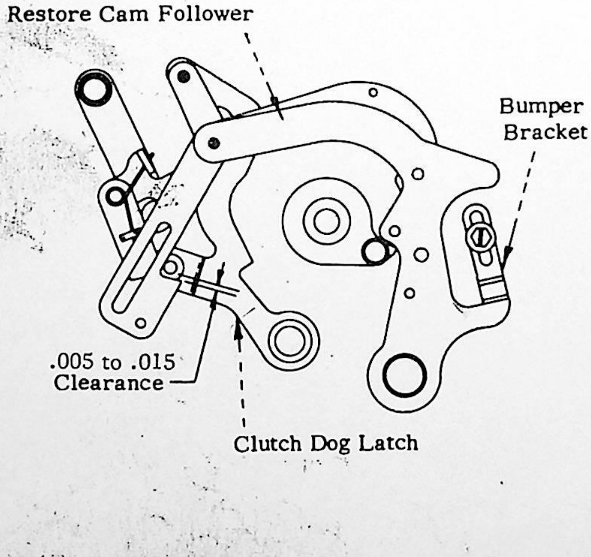
Depress any function key and rotate the drive shaft one-half turn. There should be .005" to .015" clearance between the roller and the keylatch lever. To adjust, loosen screw B only and move the key slide pivot link as required.

ADJ. 22 CLUTCH RESTORE

Rotate drive shaft until the roller on the switch link restore cam is on the high point of the clutch restore cam follower. Hold key depressed. There should be .015" clearance between the roller on the key slide pivot link and the key latch live-lip. Adjust at the eccentric, keep lobe downward.



ADJ. 23 CLUTCH RESTORE CAM FOLLOWER



With the drive shaft in home position depress any function key. There should be approximately .005" to .015" clearance between the restore cam follower and the stud on the clutch dog latch. To adjust, move the bumper bracket.

ADJ. 24 RIBBON FEED

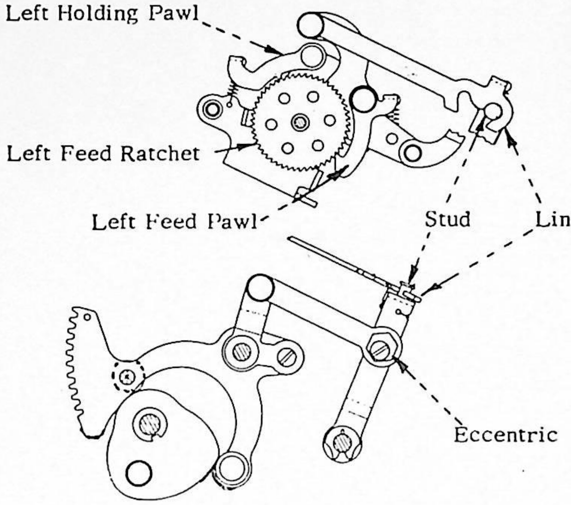


FIG. 1 LEFT RIBBON FEED

With the stud engaging the front notch of the link, as shown, rotate drive shaft to 158°. The left feed pawl should rotate the left feed ratchet about 2 1/2 teeth past the left holding pawl. Adjust at eccentric.

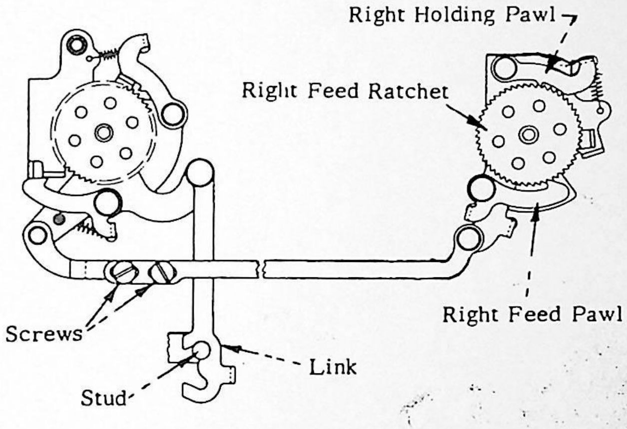
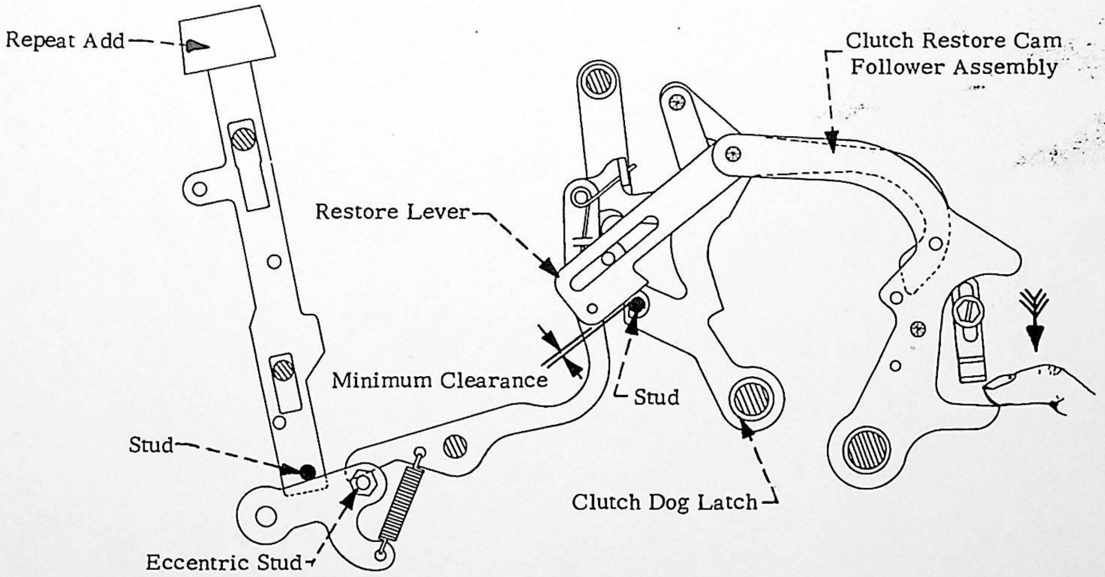


FIG. 2 RIGHT RIBBON FEED

With the stud engaging the rear notch of the link, as shown, rotate the drive shaft to 295°. The right feed pawl should rotate the right feed ratchet about 2 1/2 teeth past the right holding pawl. Adjust by loosening screws and lengthening or shortening the link as required.

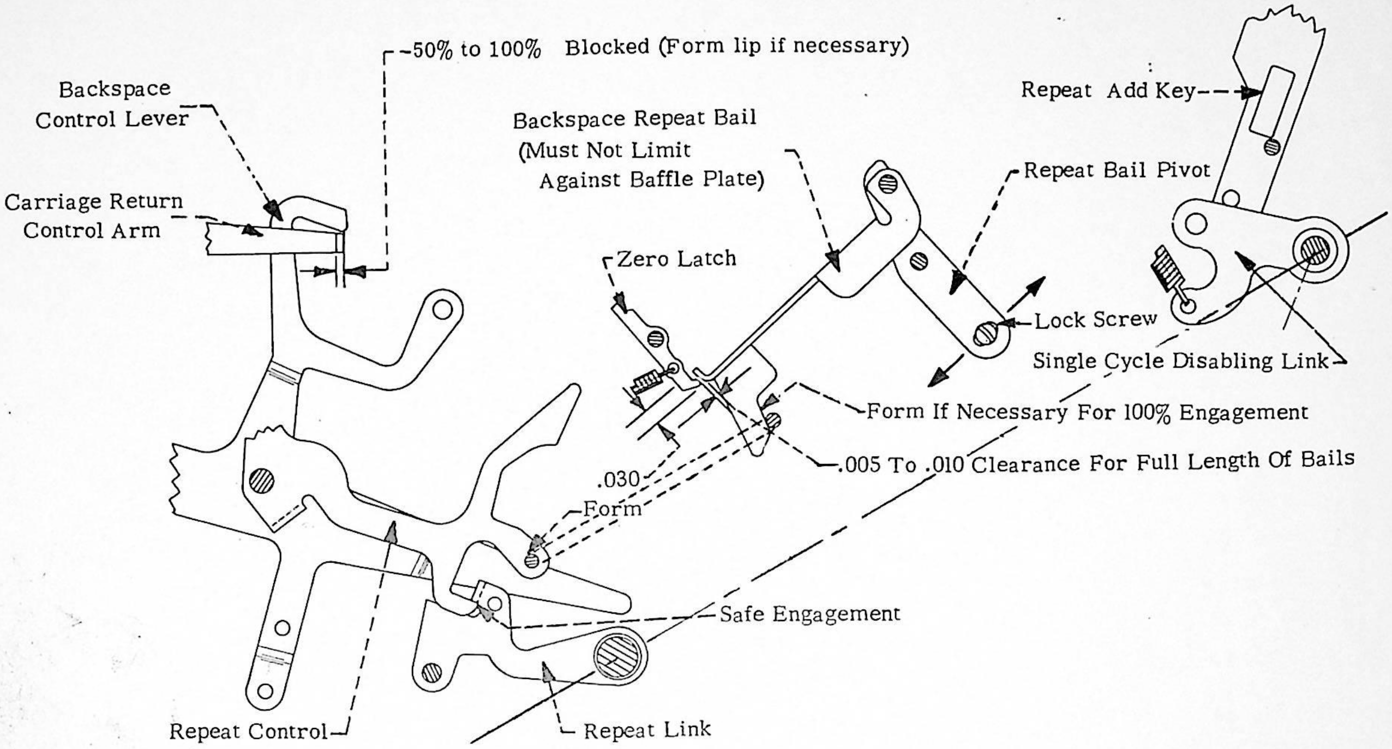
ADJ. 25 SINGLE CYCLE DISABLING



Place machine in home position, depress repeat add key, cycle machine to 60° . While holding key down loosen locknut, turn eccentric stud to obtain a minimum clearance between clutch dog latch stud and restore lever, check by moving the clutch restore cam follower assembly downward as shown tighten locknut. Cycle machine to 300°. Cycle machine to complete repeat add cycle checking key for free restoring.

Note: After re-adjustment re-check ADJ. #26.

ADJ. 26 REPEAT BAILS - REPEAT ADD


-50% to 100% Blocked (Form lip if necessary)
Backspace Control Lever
Carriage Return Control Arm
Backspace Repeat Bail (Must Not Limit Against Baffle Plate)
Repeat Add Key
Repeat Bail Pivot
Zero Latch
Lock Screw
Single Cycle Disabling Link
Form If Necessary For 100% Engagement
.005 To .010 Clearance For Full Length Of Bails
.030
Form
Safe Engagement
Repeat Control
Repeat Link

Place machine in home position (0°), select 12 numbers in selection unit, depress repeat add key, cycle machine to 60°. Loosen lock screws, adjust both repeat bail pivots to achieve equal clearance of selection dial zero latches, tighten lock screws. If needed, form repeat control in area of stud for repeat bails to block zero latches by .030". Cycle machine to complete repeat add cycle. Clear the selection unit. Manually rock repeat bails into blocking position. Check repeat bail not to bind on baffle plate, form bail lip if needed.

ADJ. 27 SELECTION CARRIAGE AND BACK SPACE RACKS

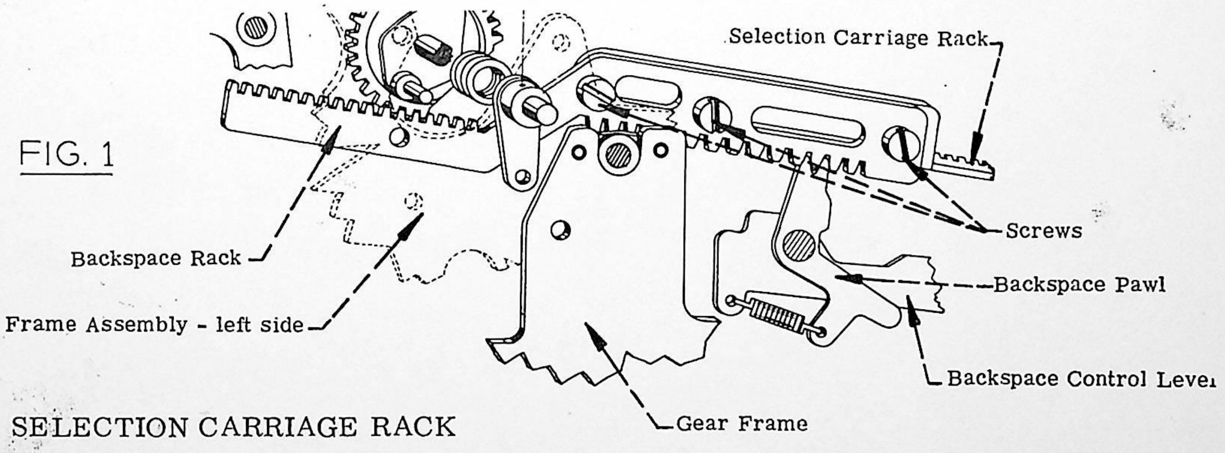


FIG. 1 SELECTION CARRIAGE RACK

With machine in home position and carriage at home. Select five numbers, loosen three locking screws enough to allow racks to slip. Manually rock back space control lever up. The teeth of the backspace pawl must enter the tooth spaces on the rack without moving the rack to the front or rear, tighten screws.

ADJ. 27 SELECTION CARRIAGE AND BACK SPACE RACKS (CON'T)

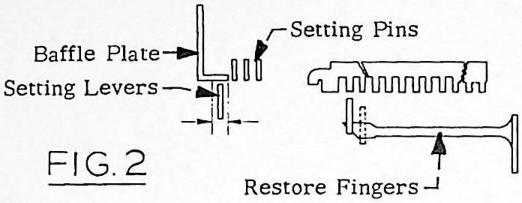


FIG. 2

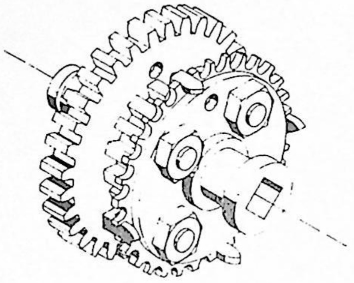


FIG. 3

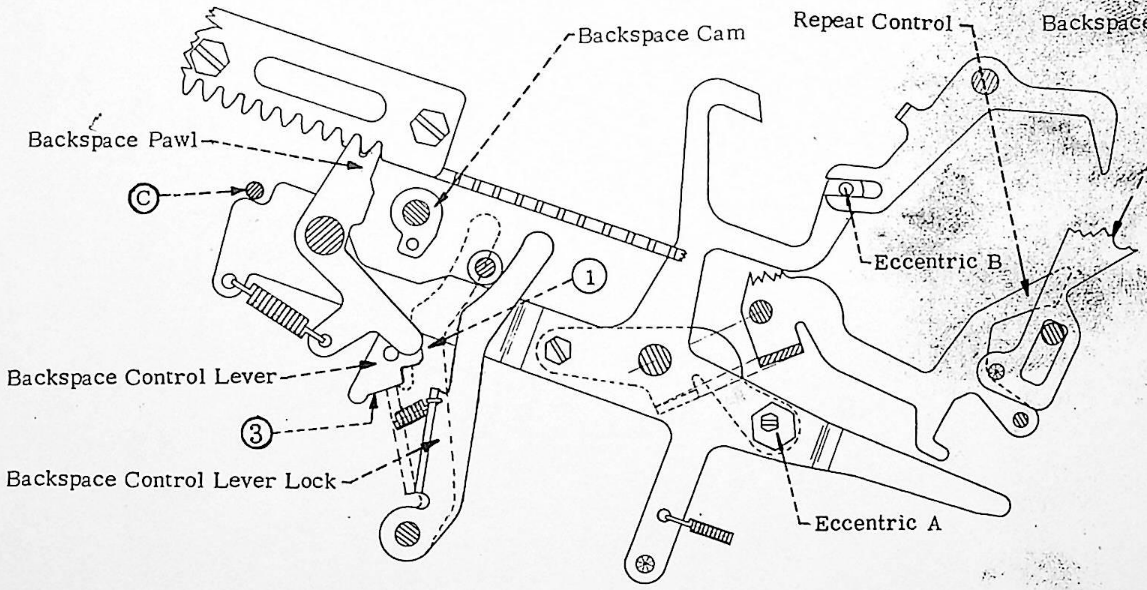
FIG. 2 PIN RESTORE

With machine in home position select an "8". Cycle machine to 325°. Baffle plate should be over setting pins 100%, and setting pin should be restored. Check restore of pin by cycling the machine to home and selecting a "9" manually rotate the sector, the sector should clear the setting pin. If pins are not sufficiently restored add shims per Adj. 10.

FIG. 3 RESTORE CLUTCH PLATE

With machine in home position loosen nuts on the carriage restore clutch plate and position so prongs on the carriage return clutch plate can freely enter the tooth spaces when these parts are pushed together. Check with carriage in each of first eight orders. After changing this adjustment recheck Adjustment #60.

ADJ. 28 BACKSPACE PAWL ENGAGEMENT IN RACK



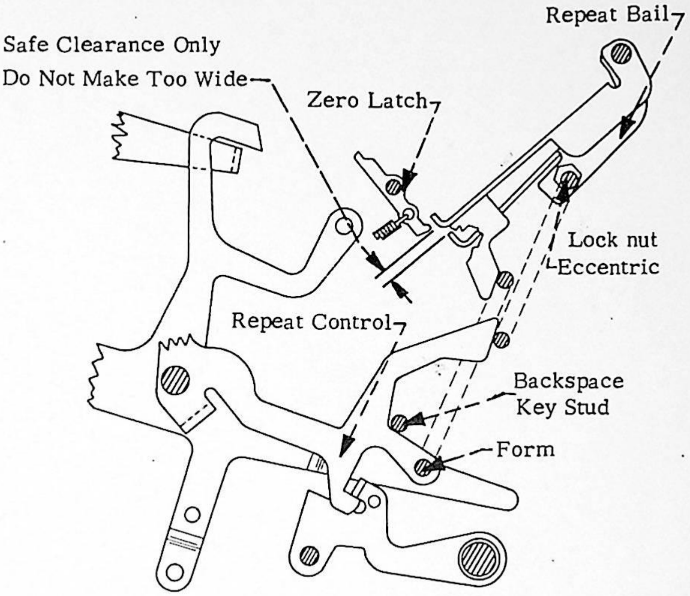
Select one number, depress backspace key, cycle machine to 60°. Adjust eccentric A to allow the backspace control lever lock to enter step 3 of the backspace control lever with a slight camming action. Manually rock the backspace control lever lock to check. Cycle to complete backspace operation.

Depress non-add key cycle machine 60°. Backspace control lever lock must stop against step 1 with a good bite. Note: If unable to obtain a good bite eccentric B may be limiting the counter-clockwise movement of the backspace control lever.

In machines after serial number 5735 stud C is adjustable. Moving stud C forward increases backspace stroke. Moving stud C rearward decreases the stroke to eliminate a double backspace.

ADJ. 29 REPEAT BAILS - BACKSPACE

Place machine in home position (0^0), select two numbers. Depress backspace key, cycle to 60^0 loosen lock nut, turn eccentric to position backspace bail clear of zero latch of sector to be restored, tighten lock nut. Check to see that bail blocks the zero latch to the left. If necessary form repeat control in area of stud.



ADJ. 30 PRINT WHEELS

FIG. 1 PRINT CONTROL BELLCRANK

Place machine in home position (0°). Place finger as shown and move each print lever up and down. There should be approximately .015"- .030" movement. Adjust by installing interchangeable roller, see note. If only one or two print arms lack sufficient movement, adjust by inserting a screwdriver as shown and prying up slightly. Caution: These parts are hardened and will break easily.

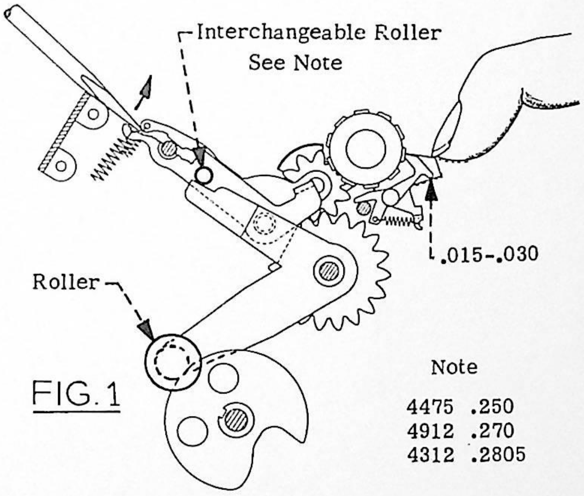


FIG. 1

Note

4475	.250
4912	.270
4312	.2805

FIG. 2 UPPER PRINT ARM COMB

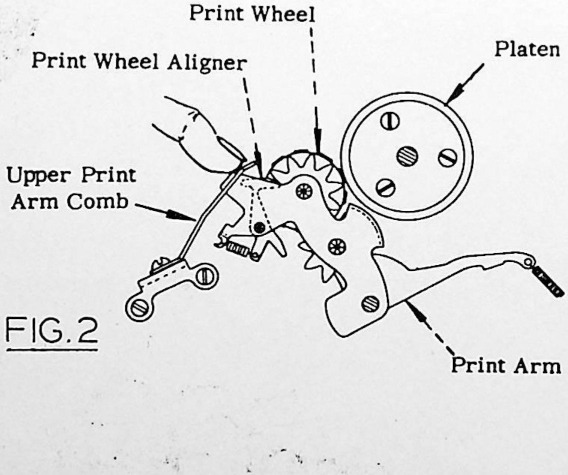


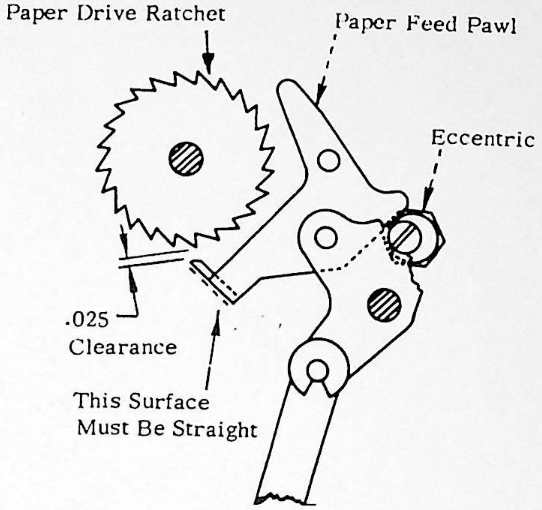
FIG. 2

With print wheels against platen, move comb right or left to approximately center print arms in slots. Placing a finger on a print arm as shown, pull it all the way down and let it up slowly. Check each print arm in the same manner. There should be no sticking or binding. The upper end of the comb should limit on machine inner frames to prevent the print wheel aligners being disengaged from the print wheels. Form comb down if needed.

ADJ. 31 PAPER FEED PAWL

With machine in home position there should be approximately .025" clearance between the feed pawl and the tips of the paper drive ratchet teeth. Adjust at eccentric, keeping high lobe toward rear of machine. The front surface of the feed pawl must be straight. Check with a straight edge and adjust by bending or replace part.

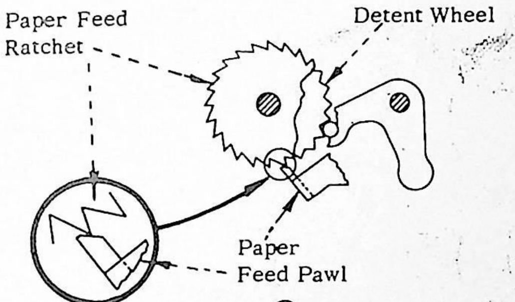
Reason: To allow platen to be turned by hand and to insure feeding correct number of spaces.

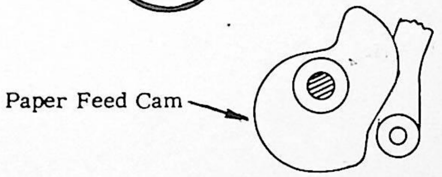


ADJ. 32 PLATEN DETENT

With the paper feed cam in the position shown loosen the set screws in the detent wheel. Rotate the platen until a point of a tooth on the paper drive ratchet is approximately centered on the feed pawl as shown in the inset. Tighten set screws. Test by printing number on tape, back up detent wheel one-half tooth, so roller is on top of tooth, print another number, the second number should print below the first.

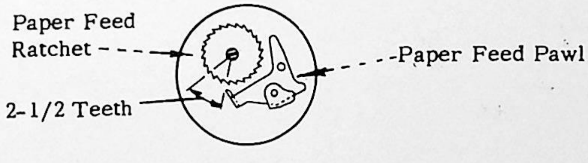
Reason: To insure feeding tape correct number of spaces.

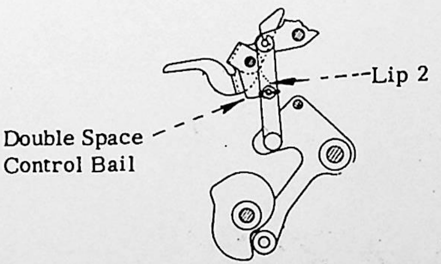




ADJ. 33 DOUBLE SPACE STOP

Depress total key and cycle machine until the paper feed pawl has backed up 2 1/2 teeth (see inset). Rotate the eccentric to just touch Lip 2 of the double space control bail.





ADJ. 34 RIBBON PRINT BLOCK CONTROL SHAFT ASSEMBLY

FIG. 1

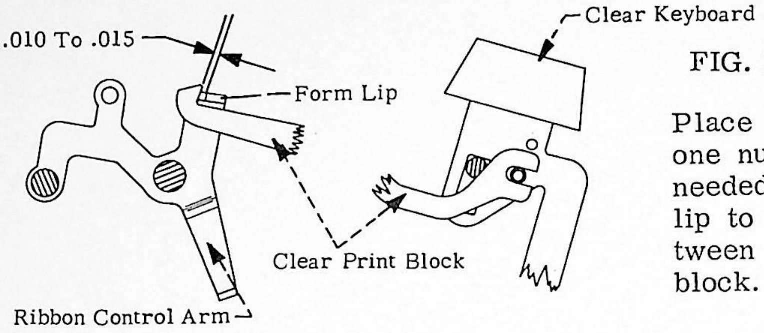


FIG. 1 CLEAR PRINT BLOCK

Place machine in home position (0°), select one number, depress clear keyboard key if needed adjust by forming ribbon control arm lip to achieve .010" to .015" clearance between ribbon control arm and clear print block.

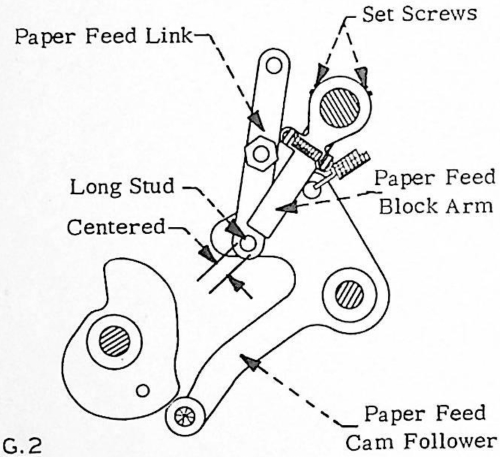


FIG. 2

FIG. 2 PAPER FEED BLOCK ARM

With machine in home position, loosen set screws, center paper feed block to long stud on paper feed link.

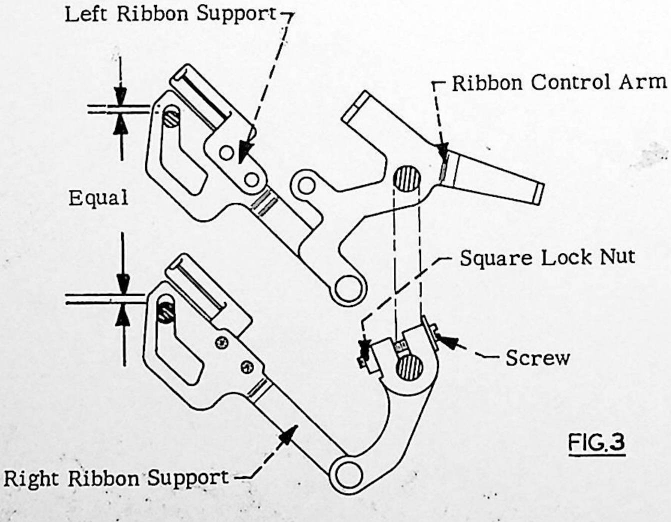


FIG.3

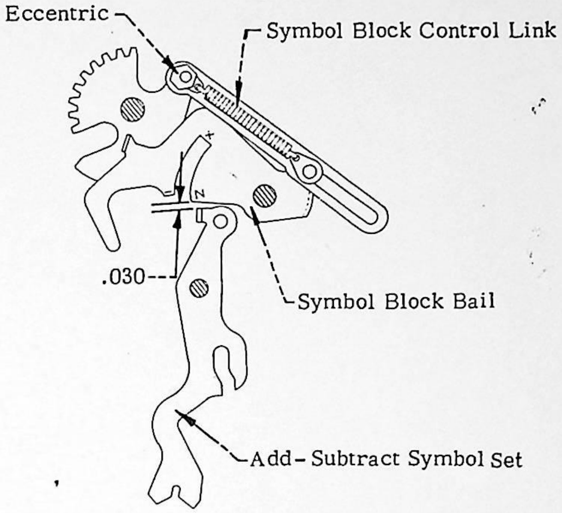
FIG. 3 RIBBON HEIGHT

Select one number, depress Clear Keyboard Key, cycle machine to 150°. Loosen locking screw, adjust right ribbon support to be equal in height with left ribbon support, tighten locking screw and nut.

ADJ. 35 SYMBOL BLOCK BAIL

Symbol block bail to have .030" clearance of add-subtract symbol block in home position.

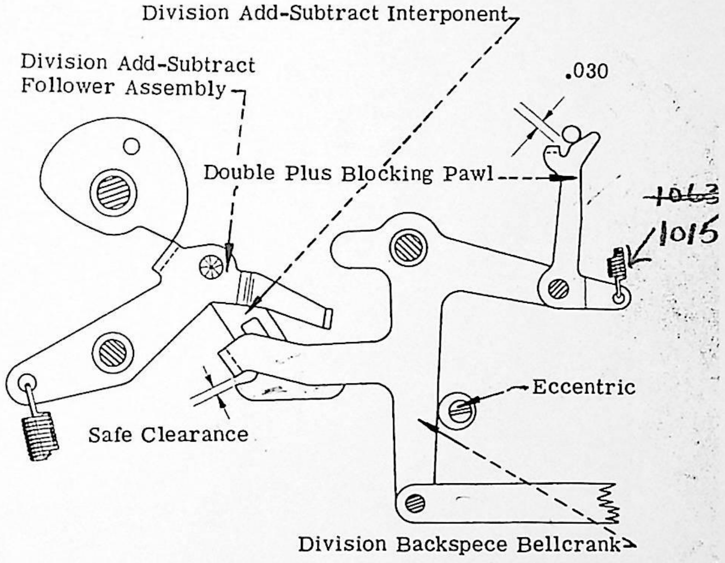
Place machine in home position (0°), loosen lock nut, turn eccentric to obtain approximately .030" clearance between symbol block bail and add-subtract symbol set, tighten lock nut, depress non-add key, cycle machine to 70°, rock drive shaft from 70° to 80°, a slight amount of drop by symbol block bail should be seen, cycle machine to complete non-add cycle.



ADJ. 36 DIVISION BACKSPACE BELLCRANK

The division backspace bellcrank to have clearance to the division add subtract interponent.

Place the machine in home position (0°), loosen the lock nut, turn the eccentric to have .030" clearance between the division backspace bellcrank and the add subtract interponent, tighten the lock nut, manually operate the credit balance indicator to check free action and clearance.

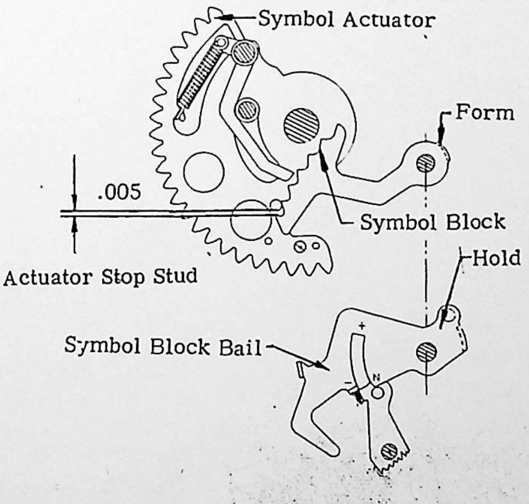

Division Add-Subtract Interponent
Division Add-Subtract Follower Assembly
.030
Double Plus Blocking Pawl
~~1063~~
1015
Eccentric
Safe Clearance
Division Backspece Bellcrank

ADJ. 37 SYMBOL BLOCK

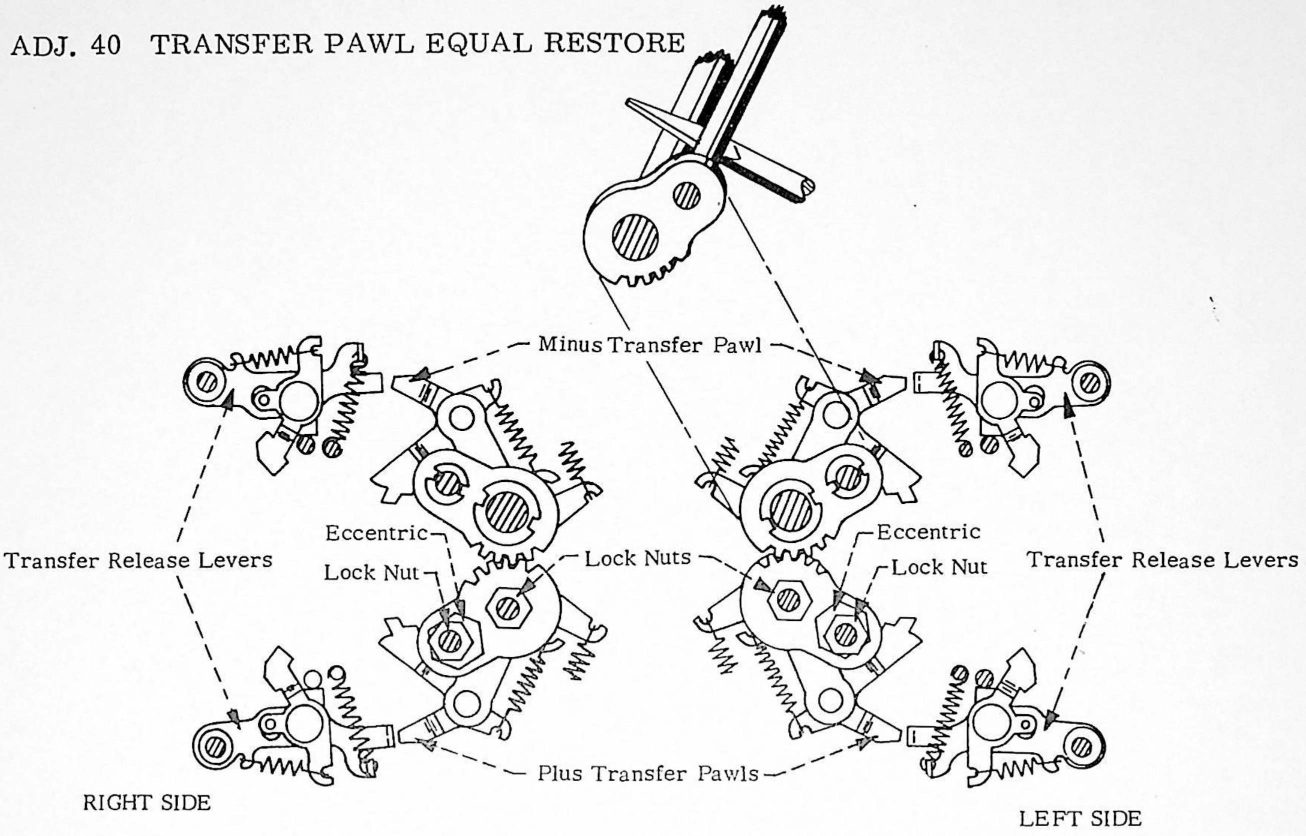
Symbol block to have .005" clearance of symbol actuator stop stud.

Place machine in home position (0°), depress subtract key, cycle machine to 90°, adjust if needed by holding symbol block bail and forming symbol block to obtain .005" clearance. Manually rock symbol actuator to check clearance.

Reason: To insure full sweep of symbol actuator to desired symbol.



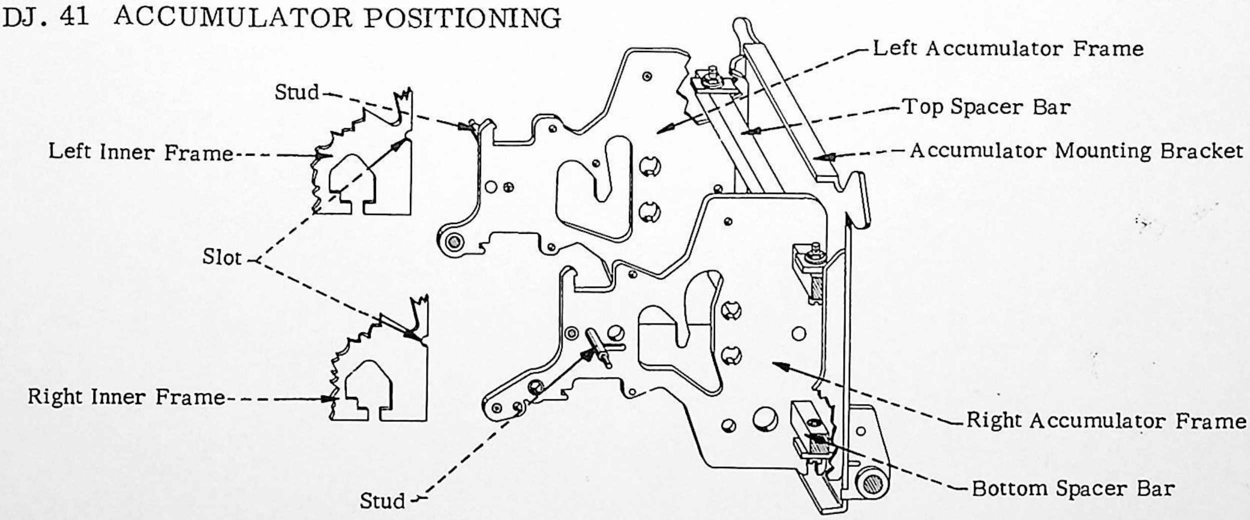
ADJ. 40 TRANSFER PAWL EQUAL RESTORE



Before installing the accumulator, check that the transfer control bails are actuating the transfer pawls evenly. To test insert a screw driver on the left top transfer control bail as shown and pry in the direction of the arrow, the transfer pawls to both have equal opening. To adjust, loosen four lock nuts, turn two eccentrics together, tighten the four lock nuts. Transfer bails must be free after adjustment is set.

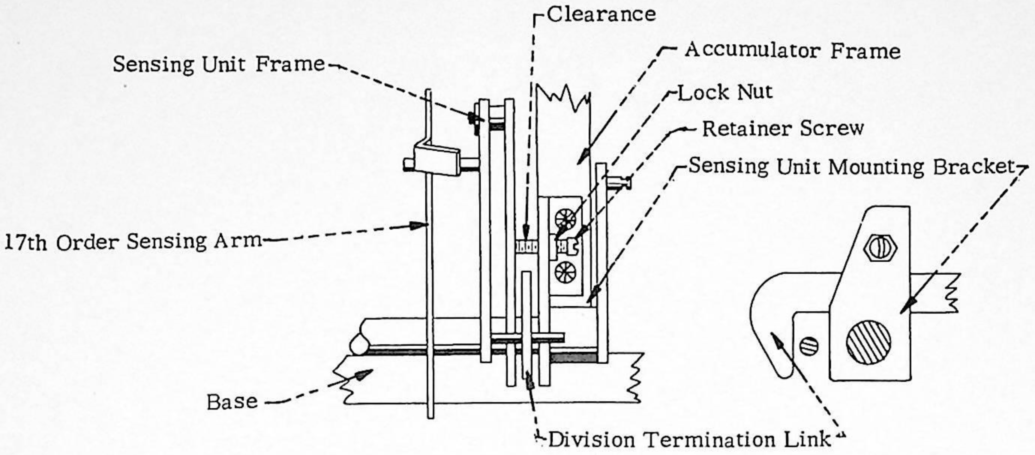
Reason: To insure that the transfer control bails have an equal amount of travel on the restore movement.

ADJ. 41 ACCUMULATOR POSITIONING



Loosen four mounting screws. Check that accumulator frames are secure in base slots and tight. Push accumulator in until accumulator positioning studs are securely in the slots on the left and right inner frames. Tighten four mounting screws.

ADJ.42 DIVISION TERMINATION LINK RETAINER

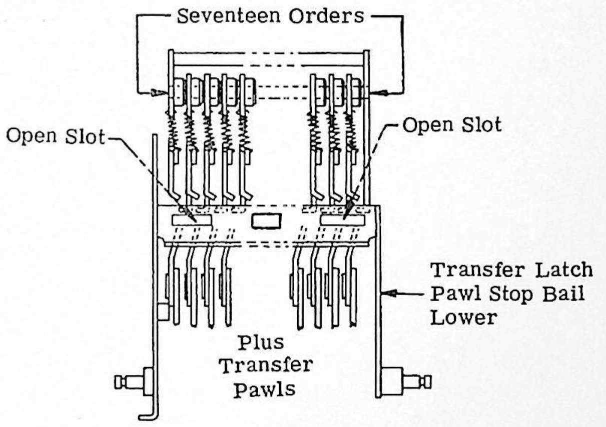


Loosen lock nut and adjust retainer screw to restrict upward movement of Division Termination Link. Caution: Maintain clearance between retainer screw and sensing unit frame. Tighten lock nut.

ADJ. 43 TRANSFER PAWLS

FIG. 1 TRANSFER PAWLS LATCHING

Depress non-add key, cycle machine to 38°. Loosen two lock screws. Turn eccentric to provide .065" to .070" clearance between transfer pawls and transfer pawl latches as shown at A. Sight through open slots in transfer latch pawl stop bail. Tighten the lock screws. Transfer control fork must align squarely with the roller without binding.



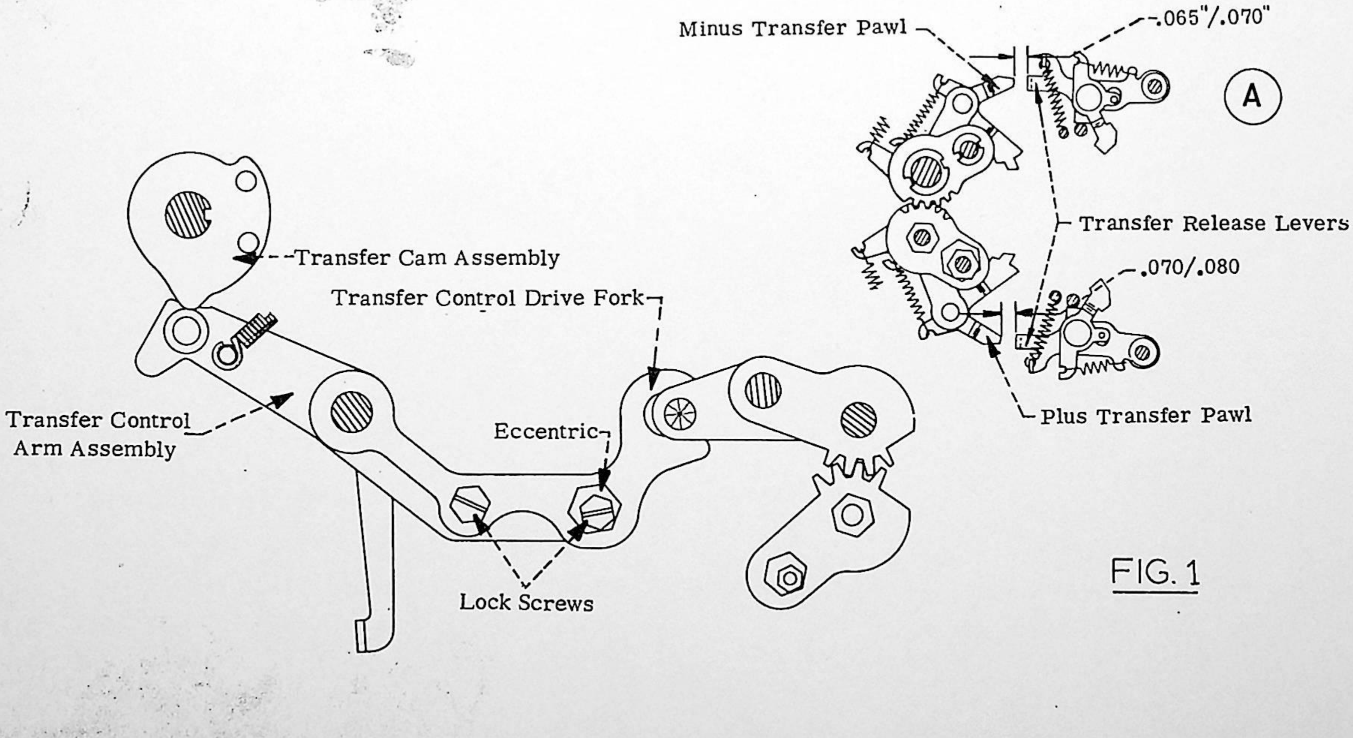
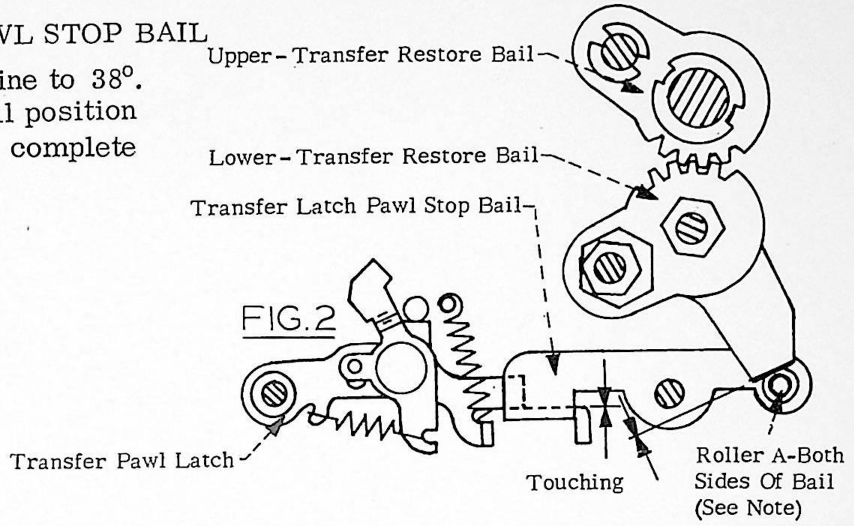


FIG. 1

ADJ. 43 TRANSFER PAWLS (con't)

FIG. 2 TRANSFER LATCH PAWL STOP BAIL

Depress non add key. Cycle machine to 38°. Select roller A from list which will position bail as shown. Cycle machine to complete non add operation.


Upper-Transfer Restore Bail
Lower-Transfer Restore Bail
Transfer Latch Pawl Stop Bail
FIG.2
Transfer Pawl Latch
Touching
Roller A-Both Sides Of Bail (See Note)

Note

Roller	Size	Color
4890	.125	Black
4891	.140	Cadmiun
4892	.156	Metal

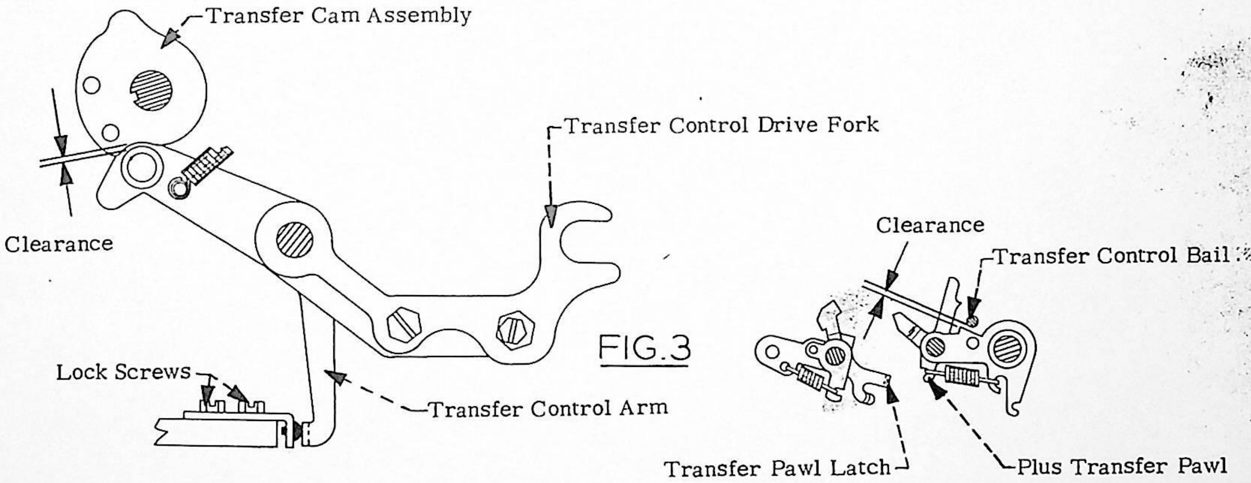
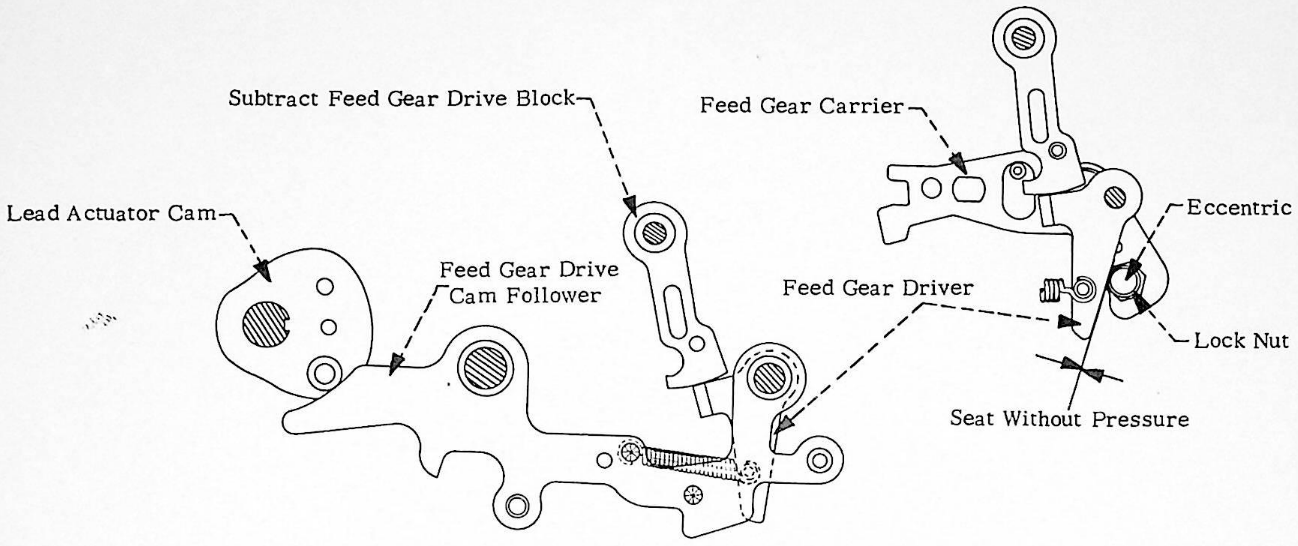


FIG. 3 TRANSFER CONTROL CAM FOLLOWER

Depress the non-add key, cycle the machine to 185°, manually release the last order plus transfer pawl, loosen two lock screws, adjust bumper for transfer control cam follower roller not to bottom on cam and to maintain a safe clearance of the transfer pawl to the transfer control bail, tighten the lock screws, cycle the machine to complete the non-add cycle.

Reason: To provide a stop for the transfer control cam follower when the accumulator transfer release occurs.

ADJ. 44 FEED GEAR CARRIER DRIVE



Depress minus key, loosen lock nut. Cycle machine to 50^0. Turn eccentric to seat feed gear carrier roller on feed gear driver without pressure. Tighten lock nut. Cycle machine to complete minus operation.

Reason: To insure feed gear alignment with rear pendant lower row of gears.

ADJ. 45 REAR PENDANT BUMPERS

FIG. 1 REAR PENDANT ENGAGED POSITION BUMPER

Depress minus key, cycle machine to 60^0. Rear pendant must be all the way into the accumulator and against its fixed stops on the feed gear carriers. Loosen lock screws and turn eccentric to bring bumper up to lower shaft of rear pendant with slight pressure.

Reason: To prevent noise.

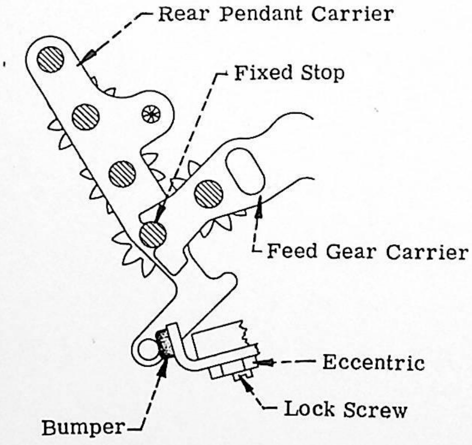


FIG.1

FIG. 2 REAR PENDANT HOME POSITION BUMPER

In home position adjust bumper to rear pendant lower shaft with no clearance and no pressure.

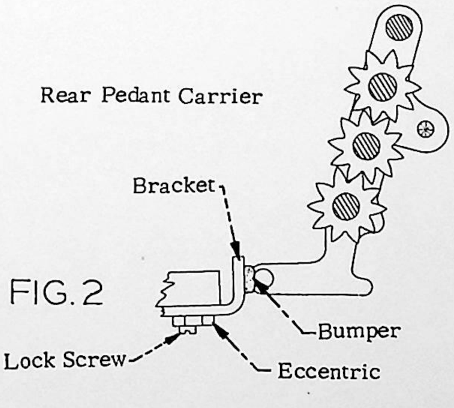


FIG.2

ADJ. 45 REAR PENDANT BUMPERS (continued)

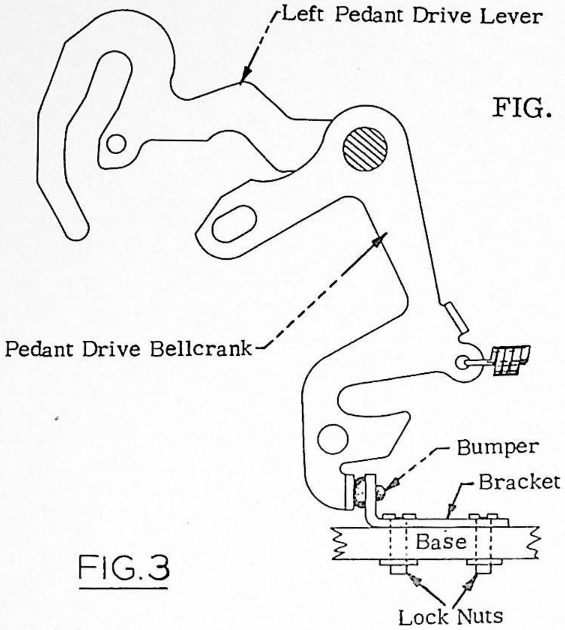
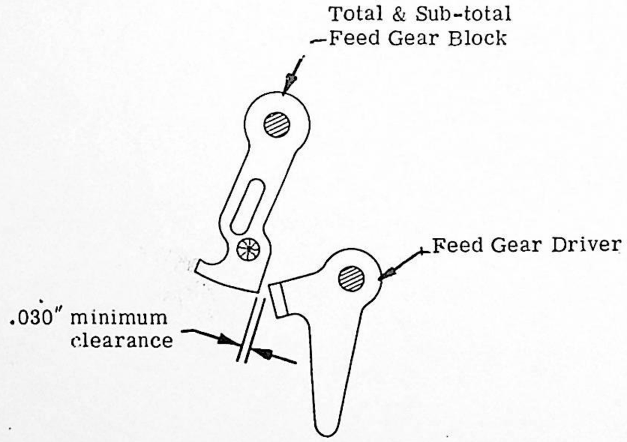


FIG.3

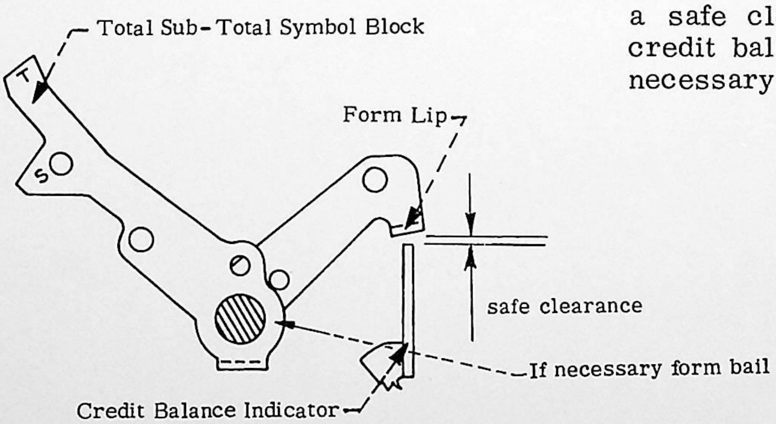
FIG. 3 REAR PENDANT DRIVE BELLCRANK BUMPER

Depress minus key, cycle machine to 60°, loosen lock nuts, adjust bumper to come against ear on pendant drive bellcrank with no pressure and no clearance.

ADJ. 46 TOTAL SUB-TOTAL SYMBOL BLOCK TO CREDIT BALANCE INDICATOR



With credit balance indicator ear as shown, depress the total key and cycle machine to 20°. Form the lip on the total and sub-total symbol block to obtain a minimum of .030" clearance between total sub-total feed gear block and the feed gear driver, but maintain a safe clearance between the lip and the credit balance indicator in home position. If necessary form bail.



ADJ. 47 TOTAL SUB-TOTAL LINKS

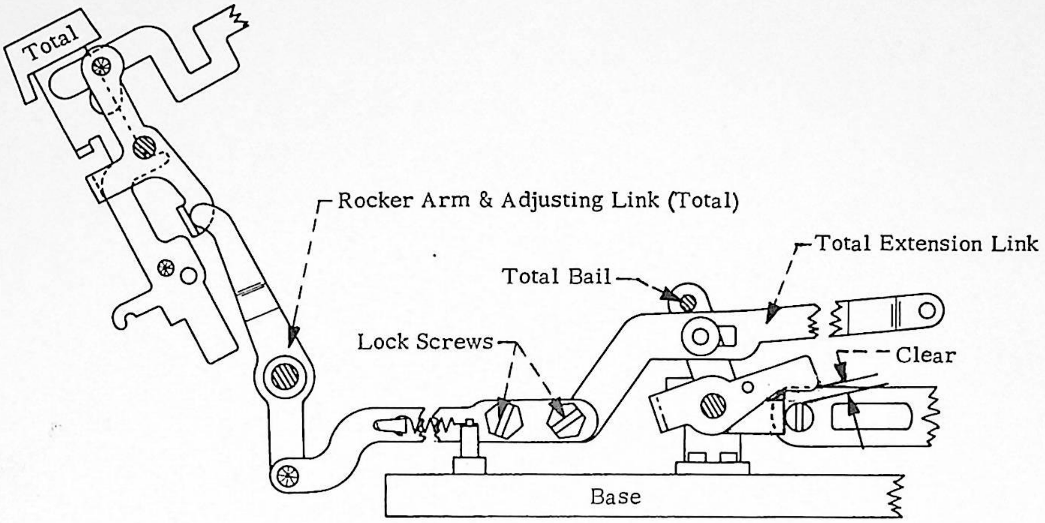


FIG. 1 TOTAL LINK

Place machine in home position (0°), depress total key, cycle machine to 5°, loosen lock screws, hold rocker arm and slip total adjusting link for total bail lip to clear eccentric stud on total trip slide, tighten lock screws, keep adjusting link and bail arm horizontal to base, cycle machine to complete total cycle.

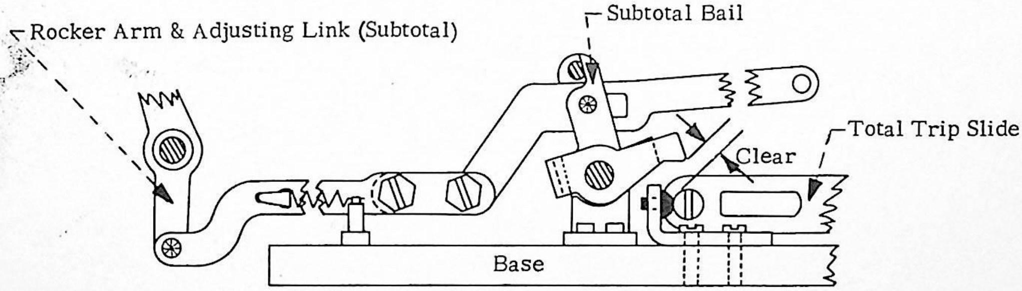


FIG. 2 SUB TOTAL LINK

Depress sub total key, cycle machine to 5°, loosen lock screws, hold rocker arm and slip sub total adjusting link for total and sub total bail lips to clear eccentric stud on total trip slide, tighten lock screws, keep adjusting link and bail arm horizontal to base, cycle machine to complete sub total cycle.

ADJ. 48 TOTAL SUB-TOTAL POWER SET CYCLE LOCK

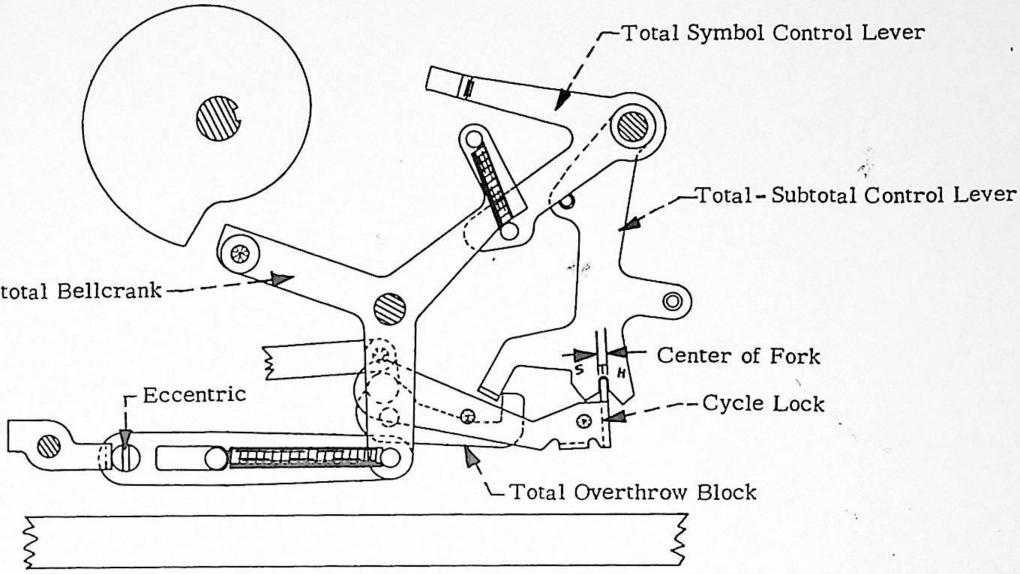


FIG. 1 TOTAL

Place machine in home position (0°), depress total key, cycle machine to 40°, loosen lock nut, turn eccentric stud to position total sub-total control lever to freely accept cycle lock in center of fork. To check use spring hook, manually disengage and engage cycle lock, tighten lock nut.

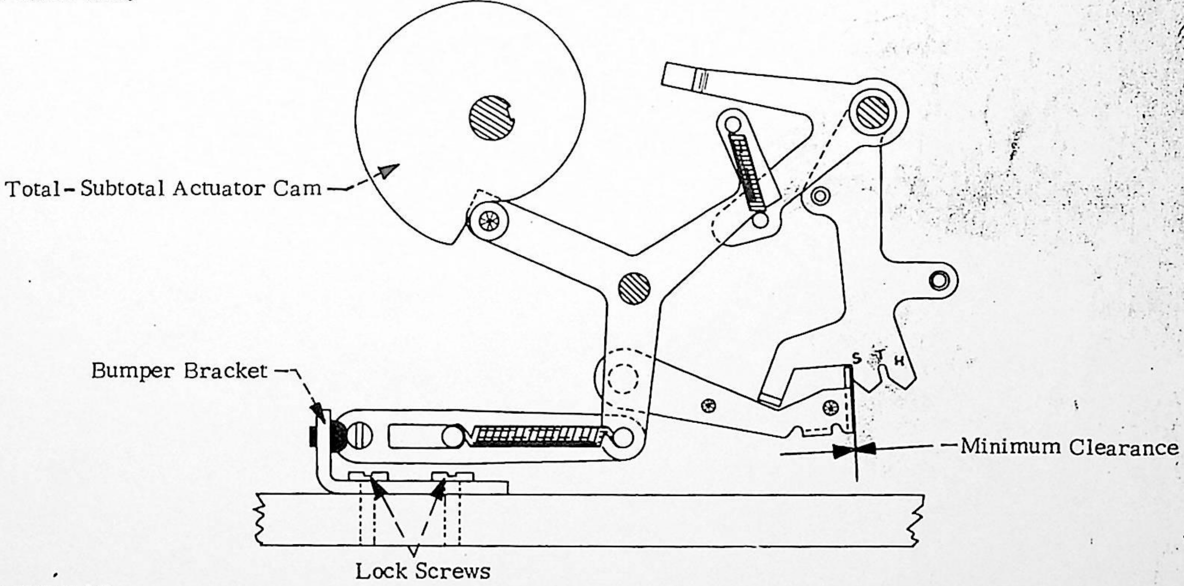
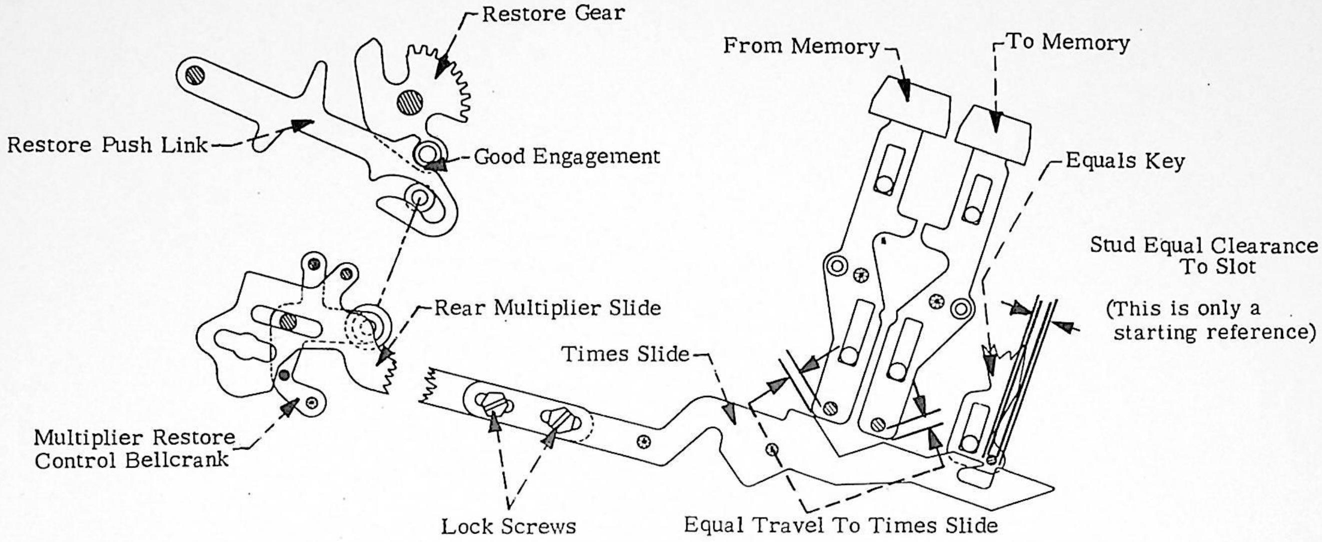


FIG. 2 SUB TOTAL

Depress sub total key, cycle machine to 40°, loosen lock screws, slide bumper bracket to position total sub-total control lever to accept cycle lock in front of fork with a minimum clearance. To check use spring hook, manually disengage and engage cycle lock, tighten lock screws.

ADJ. 49 TIMES SLIDE - MEMORY KEYS


Restore Gear
Restore Push Link
Good Engagement
Rear Multiplier Slide
Multiplier Restore Control Bellcrank
Times Slide
Lock Screws
From Memory
To Memory
Equals Key
Stud Equal Clearance To Slot
(This is only a starting reference)
Equal Travel To Times Slide

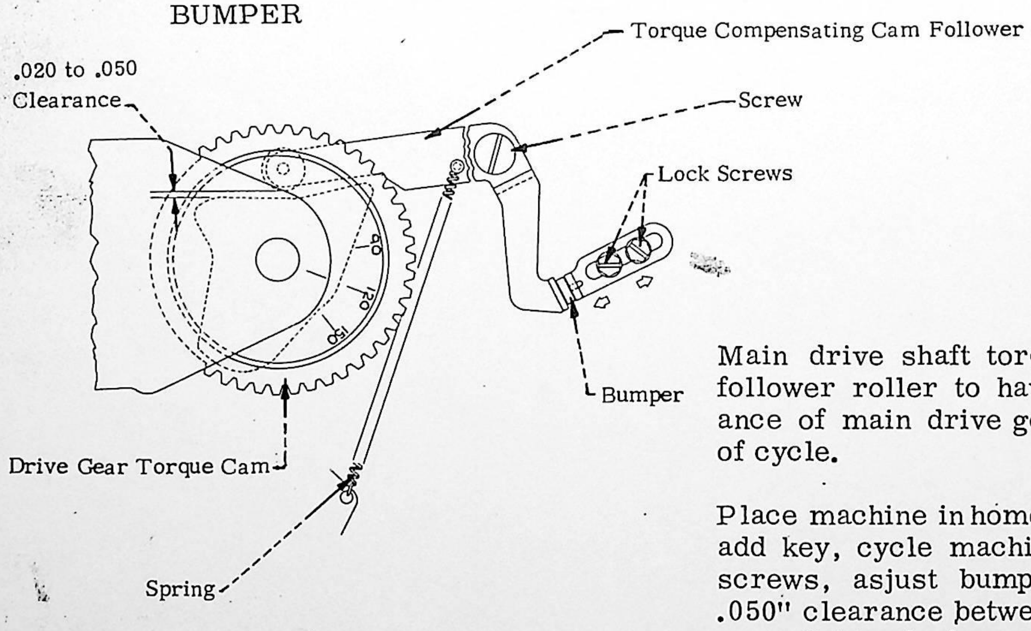
Both memory keys must drive the times slide sufficiently to raise the restore push link into good engagement with the roller on the rocker gear.

As a starting point for this adjustment, have the machine in home position, loosen the lock screws on the times slide, depress both the memory keys. Adjust the times slide so the studs on the memory keys are at an equal depth in the notch in the times slide. Tighten the lock screws.

Depress the to memory key check for good engagement between the restore push link and the roller on the restore gear. Release the to memory key and depress the from memory key check engagement of push link and roller. If necessary loosen lock screws and adjust to provide good engagement of push link and roller.

Select one number and depress equals key. The lower stud on the equals key must enter the slot in the times slide without interference. If necessary re-adjust times slide.

ADJ. 50 MAIN DRIVE SHAFT TORQUE COMPENSATING CAM FOLLOWER LIMIT BUMPER

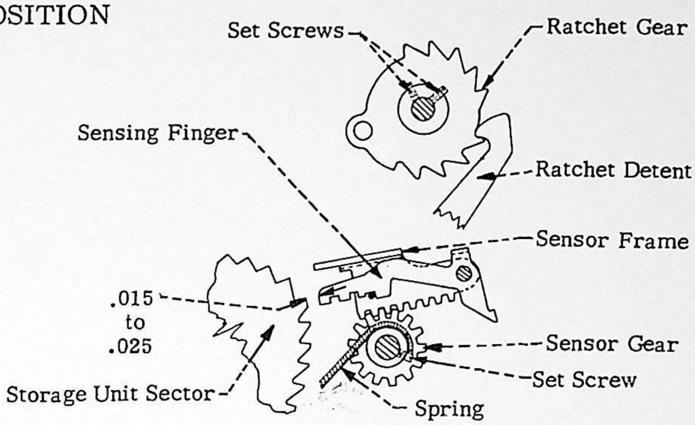


Main drive shaft torque compensating cam follower roller to have .020" to .050" clearance of main drive gear torque cam at 120° of cycle.

Place machine in home position, depress non-add key, cycle machine to 120°, loosen lock screws, asjust bumper to obtain .020" to .050" clearance between torque compensating cam, tighten lock screws.

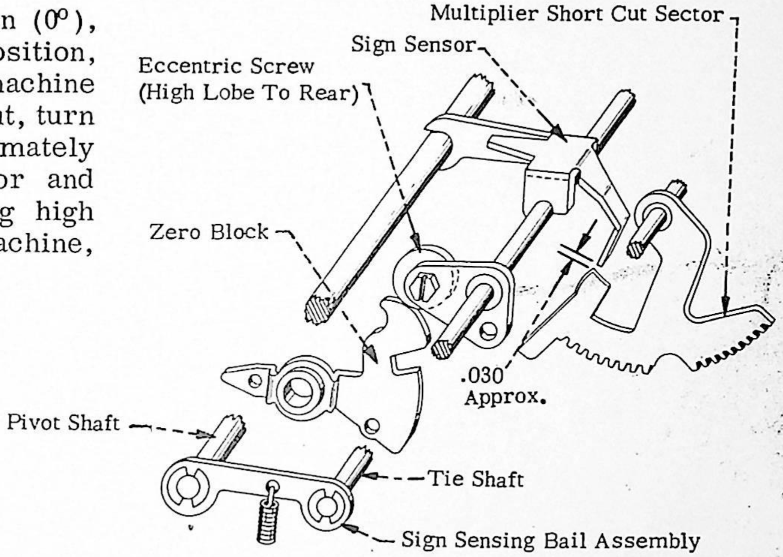
ADJ. 51 MULT SENSING FINGER HOME POSITION

With no selection, depress times key, cycle machine one complete cycle this will restore storage unit sectors to zero position. Loosen set screws in ratchet gear, adjust sensing finger by rotating shaft to have .015" to .025" clearance of mult sensing finger and storage unit sector, tighten two set screws while maintaining .003" clearance between left frame and ratchet gear.



ADJ. 52 MULTIPLIER SIGN SENSOR HOME POSITION

Place the machine in home position (0°), with the selection unit in home position, depress the times key, cycle the machine one complete cycle, loosen the lock nut, turn the eccentric screw to have approximately .030" clearance between sign sensor and multiplier short cut sector, keeping high lobe of eccentric to rear of the machine, tighten lock nut.

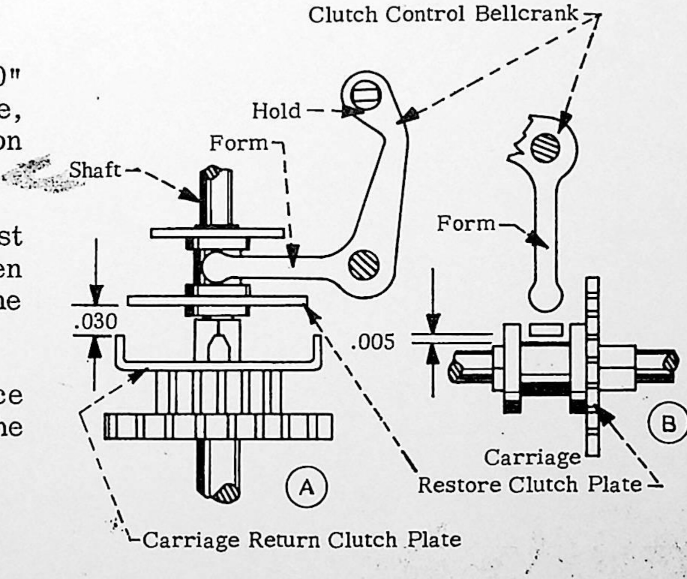


ADJ. 53 CARRIAGE RESTORE CLUTCH PLATE - CLUTCH CONTROL BELLCRANK

Carriage restore clutch plate to have .030" clearance of carriage return clutch plate, clutch control bellcrank not to bottom on carriage restore clutch plate.

Ⓐ Place machine in home position (0°), adjust by forming to achieve .030" clearance between the carriage restore clutch plate and the carriage return clutch plate.

Ⓑ Adjust by forming to have .005" clearance between the clutch control bellcrank and the carriage restore clutch plate.



ADJ. 54 MULTIPLIER CARRIAGE

FIG. 1 MULT. CARRIAGE RESTORE and STOP LATCH RESTORE

With all carriages in home position, adjust eccentric stud to obtain .030" clearance between the stud and multiplier carriage restore interponent.

Depress the non-add key and cycle the machine to 320°-325°. There should be clearance between the mult carriage release arm and the carriage stop latch as shown. If necessary re-adjust eccentric stud to obtain sufficient clearance.

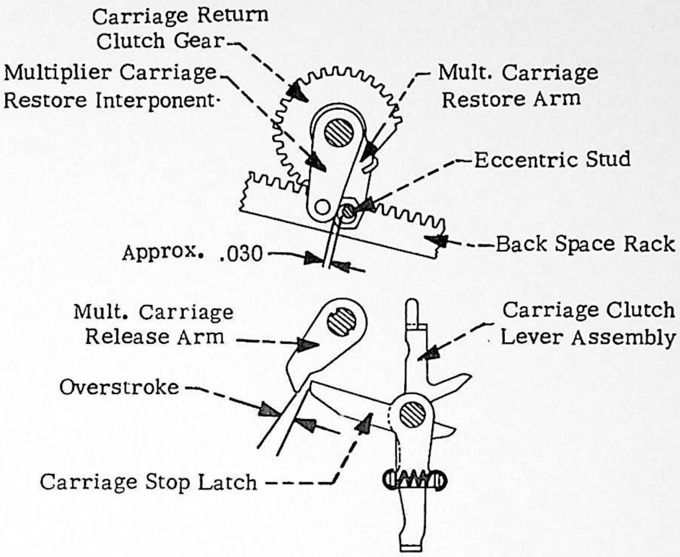
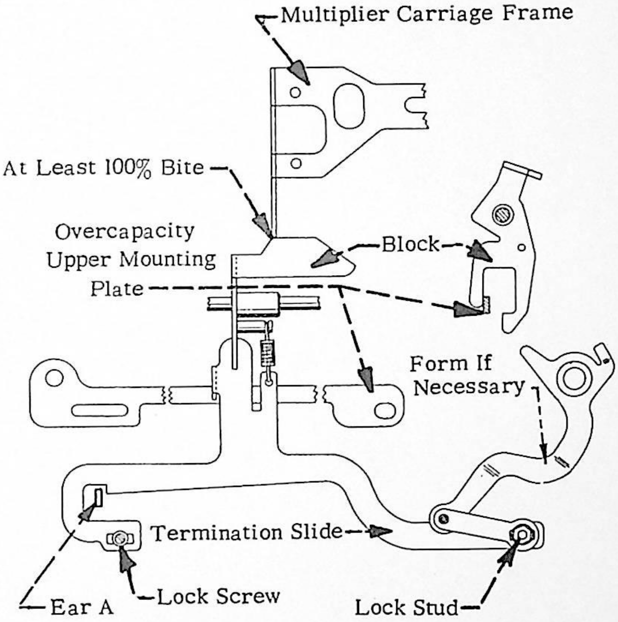

Carriage Return Clutch Gear
Multiplier Carriage Restore Interponent
Mult. Carriage Restore Arm
Eccentric Stud
Back Space Rack
Approx. .030
Mult. Carriage Release Arm
Carriage Clutch Lever Assembly
Overstroke
Carriage Stop Latch

FIG. 2 MULT TERMINATION BLOCK

The mult termination block to have at least a 100% bite of the multiplier carriage frame with a figure in the first order mult sector.

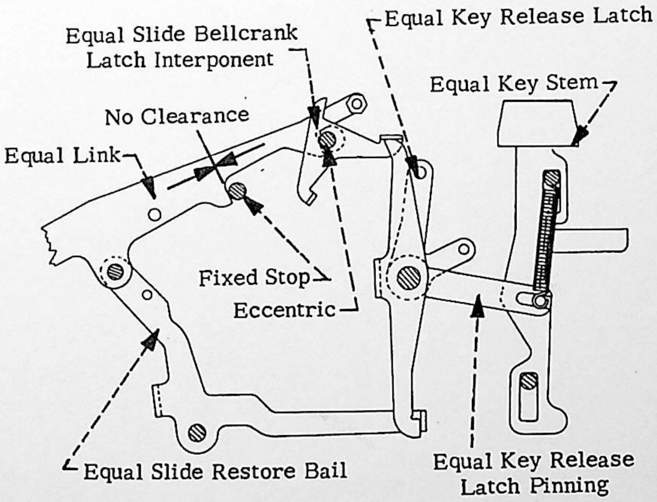
Select one number in the selection unit, depress the times key, cycle the machine one complete cycle, loosen the lock screw and the lock stud, adjust the termination block by sliding the termination slide to have at least 100% bite of the multiplier frame, tighten the lock screw and lock stud.

Depress "x" key and cycle machine to 158°. The termination slide should latch on ear A. Form arm as indicated, if necessary, to insure latching.



ADJ. 55 EQUALS SLIDE - EQUALS KEY DEPRESSION

Place the machine in home position (0°). Depress the times key and cycle the machine one complete cycle. Select one number in the selection unit. Depress the equals key. Loosen the lock nut and turn the eccentric to position the equals slide against its fixed stop with no spongy feeling in the equals key. Tighten the lock nut and cycle the machine to complete the equals operation.



ADJ. 56 COUNTER RATCHET

FIG. 1 COUNTER FEED CAM FOLLOWER

Counter feed pawl to be flush with fixed stop when counter feed cam follower roller is on high lobe of cam, counter ratchet gear to overstroke counter ratchet detent.

Place machine in home position (0°), select number 1 in selection unit, depress squaring key, cycle machine one complete cycle, depress equals key, cycle machine to 180°, loosen three lock screws, insert screwdriver as shown, pry apart to seat counter feed cam follower roller on cam surface and counter feed pawl flush with fixed stop, tighten lock screws, check counter ratchet gear to overstroke ratchet detent, cycle machine to complete equals operation. Re-check Adj. 64.

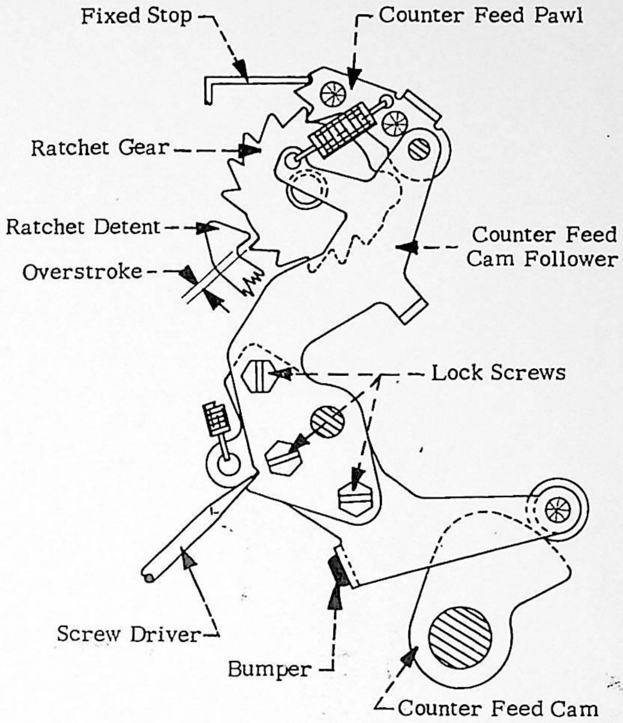
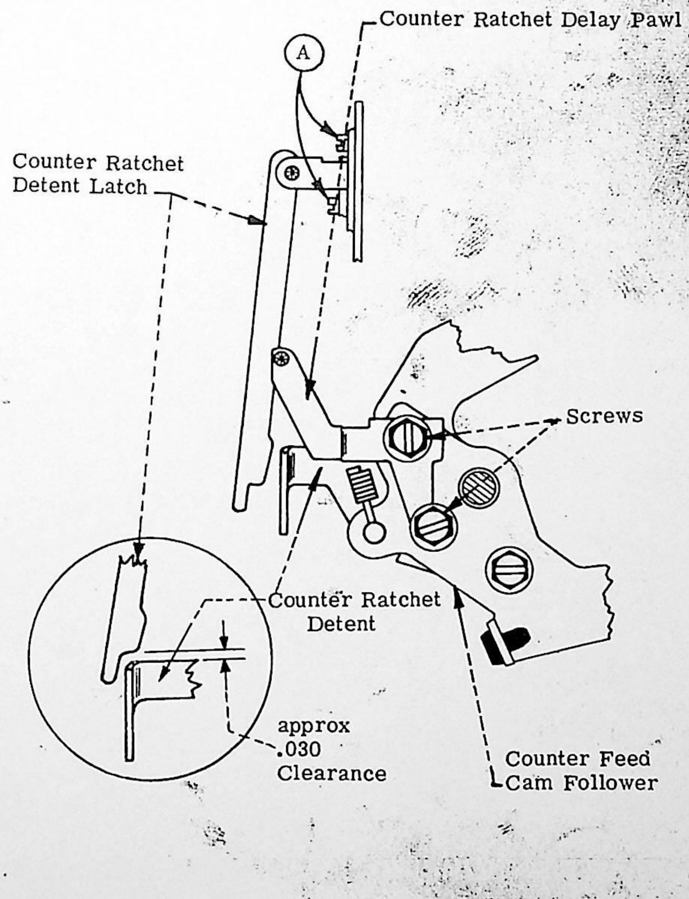


FIG. 2 COUNTER RATCHET DETENT DELAY LATCH

Counter ratchet detent delay must hold counter ratchet detent away from ratchet gear long enough to insure time for mult sensing, but must release counter ratchet detent at 150°.

Select "11" depress squaring key, cycle machine one complete cycle. Depress equals key, cycle machine to 150^{0}, loosen two upper screws on counter feed cam follower, adjust counter ratchet delay pawl to drive latch off tail of detent. Cycle machine to 295^{0} Loosen screws A, adjust to approximately .030" clearance between latch and detent as shown in inset.

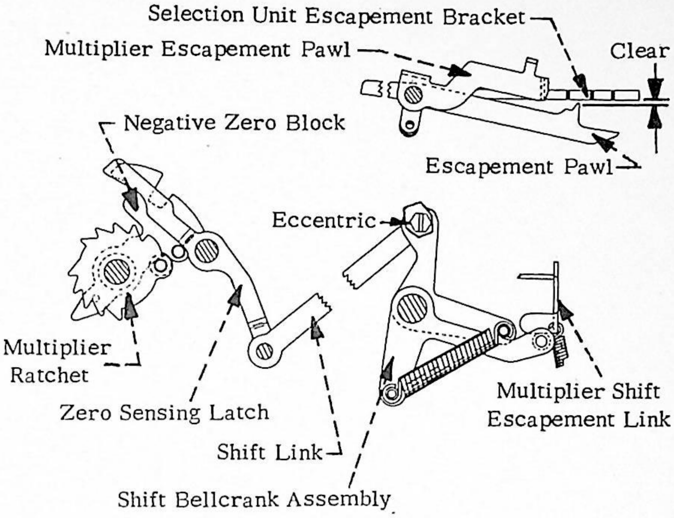
Select number one in selection unit, depress equals key, cycle machine slowly check that latch is driven off detent at 150^{0}.

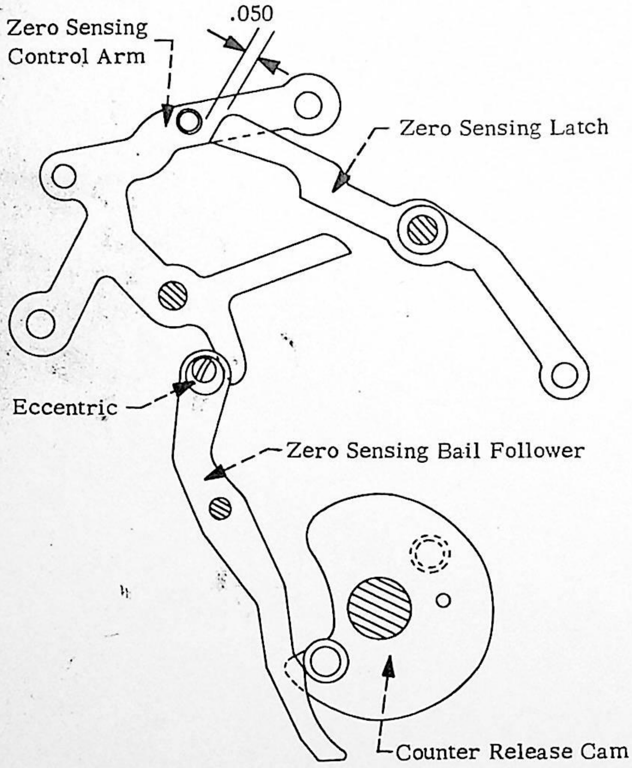

A
Counter Ratchet Delay Pawl
Counter Ratchet Detent Latch
Screws
Counter Ratchet Detent
approx .030 Clearance
Counter Feed Cam Follower

ADJ. 57 EQUALS OPERATIONS AUTOMATIC SELECTION UNIT ESCAPEMENT

Place machine in home position (0°), select eight '1's' in selection unit, depress squaring key, cycle machine one complete cycle, depress equals key, cycle machine to 180°, loosen lock screw, turn eccentric to position the selection unit escapement pawl to clear the escapement comb, tighten the lock screw, cycle machine through complete equals operation checking each overstroke position to automatically escape selection unit.

NOTE: Keep lobe of eccentric up.



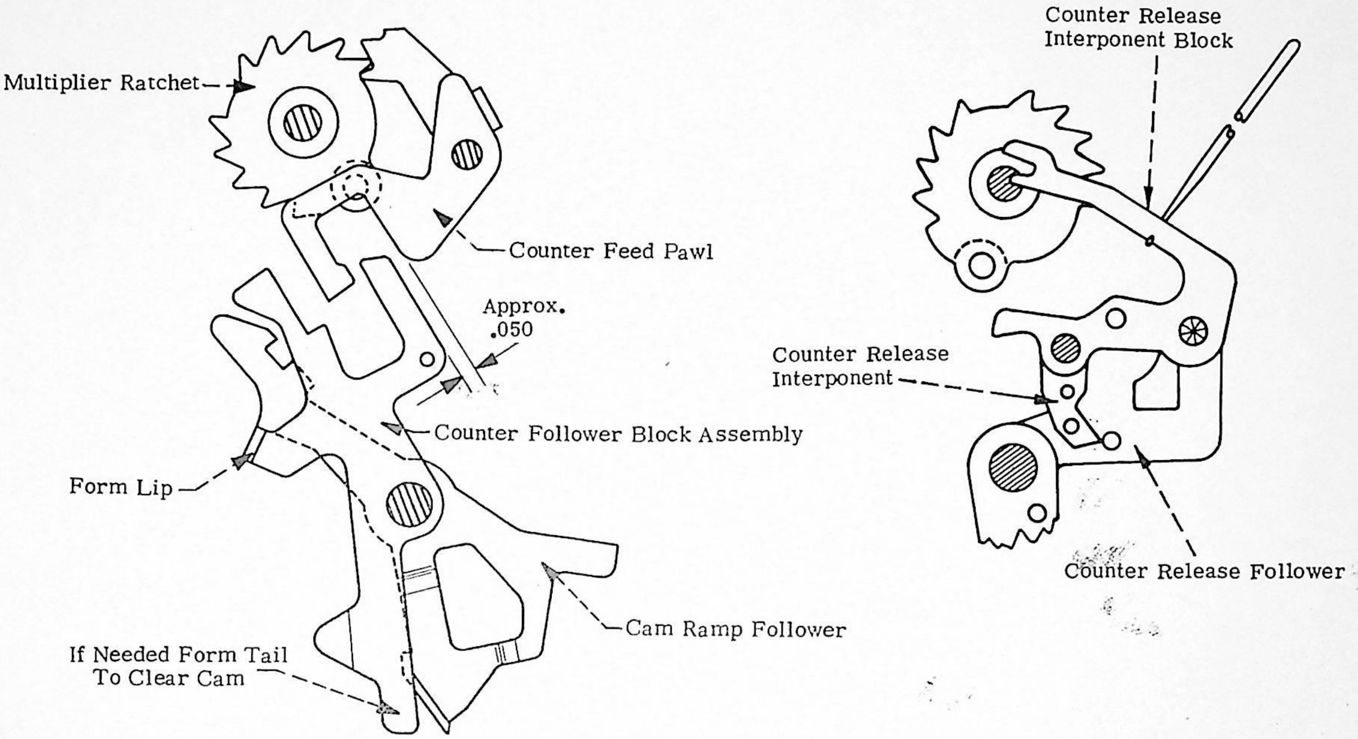


ADJ. 58 ZERO SENSING BAIL

Depress non-add key, cycle machine to farthest throw of zero sensing control arm during second half of machine cycle, loosen lock nut, turn eccentric to obtain .050" clearance between zero sensing latch, tighten lock nut.

After re-adjustment check Adj. 63

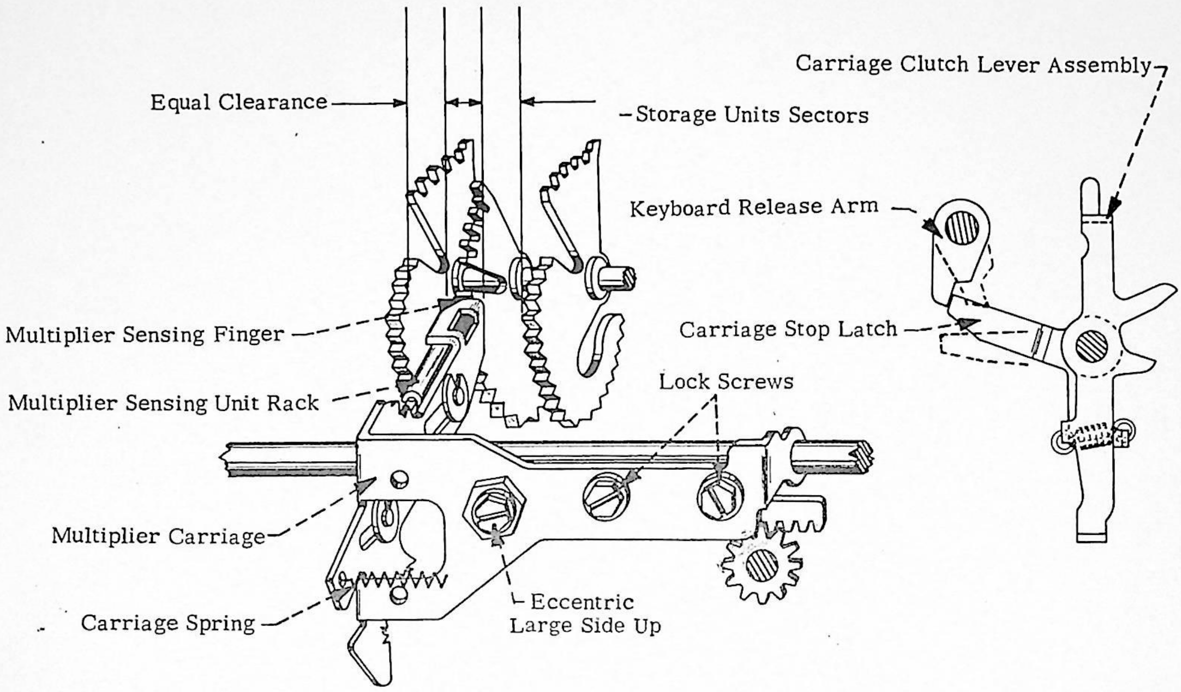
ADJ. 59 COUNTER FEED PAWL RESTORE


Multiplier Ratchet
Counter Feed Pawl
Approx. .050
Counter Follower Block Assembly
Form Lip
Cam Ramp Follower
If Needed Form Tail To Clear Cam
Counter Release Interponent Block
Counter Release Interponent
Counter Release Follower

Place the machine in home position (0°). Select one number in the selection unit. Depress the squaring key and cycle the machine one complete cycle. Depress the equals key and cycle the machine to 150°. Adjust by forming the lip on the counter follower block to achieve approximately .050" clearance of the counter feed pawl elbow.

Check - Select 11 in selection unit, depress squaring key one complete cycle, depress equals key, cycle until carriage makes its first escapement at 240°, manually lift counter release interponent and slowly return it to its down position. Counter release interponent block should clear stud on counter release follower.

ADJ. 60 MULTIPLIER SENSING FINGER CENTRALIZING



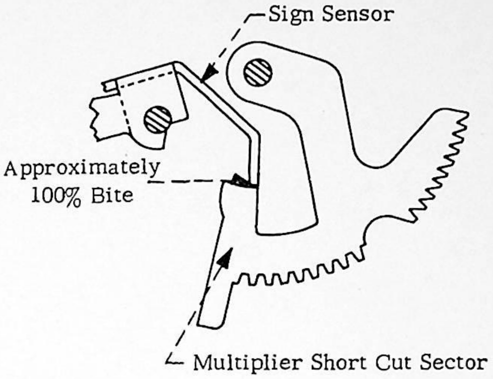
The multiplier sensing finger to have equal clearance between the storage unit sectors.

Place the machine in home position (0°), select 40404040 in the selection unit, depress the squaring key, cycle the machine one complete cycle, depress the equals key, cycle the machine one complete cycle, loosen the lock screws, turn the eccentric to obtain equal clearance of the storage unit sectors to the multiplier sensing finger, tighten the lock screws being careful to keep two carriage parts horizontal to carriage shaft, continue cycling machine to complete equals operation checking as multiplier senses each storage unit sector.

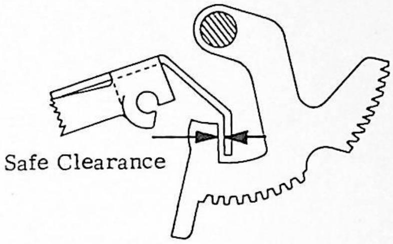
Place the machine in home position, escape the selection unit 16 places with the sector delay arm, release multiplier carriage by moving the carriage clutch lever to rear of machine, unhook multiplier carriage spring from carriage, slide multiplier carriage left and right, if any bind or drag check multiplier carriage parts for being horizontal to shaft, and check for equal depth of tooth engagement on either end of rack, loosen lock screws to correct if needed, tighten lock screws, hook up multiplier carriage spring, depress keyboard clear key, cycle machine one complete cycle.

ADJ. 61 SIGN SENSING BAIL

Place the machine in home position (0°). Select number 4 in the selection unit. Depress the squaring key and cycle the machine one complete cycle. Depress the equals key, do not cycle machine. The sign sensor at this time to have approximately 100% bite of the multiplier short cut sector. If needed, form the sign sensor.

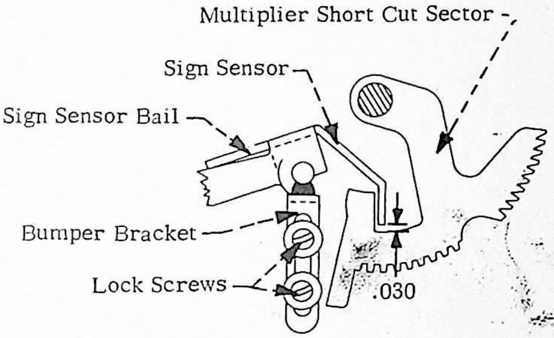


Check - Select 5 in the selection unit. Depress squaring key and cycle machine one complete cycle. Depress equals key, do not cycle machine. The sign sensor must clear the step of the short cut sector.



ADJ. 62 SIGN SENSOR LIMIT BUMPER - SHORT CUT

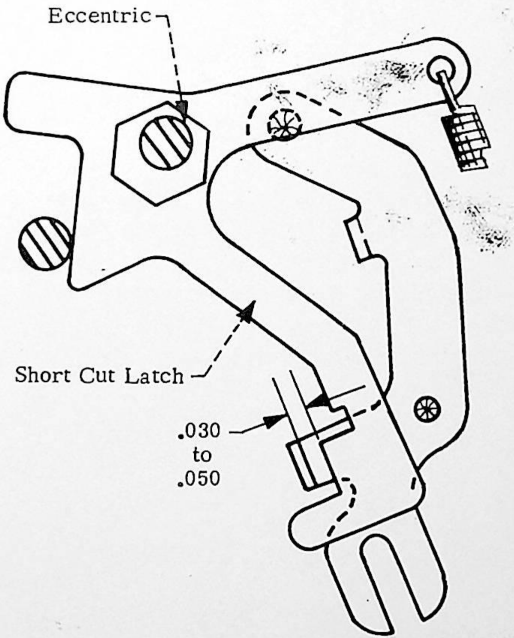
With machine in home position select number 5. Depress the squaring key and cycle machine one complete cycle. Depress the equals key, do not cycle machine. The sign sensing bail should come to rest with a slight amount of pressure on bumper with .030" clearance minimum. Re-check Adj. 65.



ADJ. 63 SHORT CUT RELEASING

Place machine in home position, depress non-add key, cycle to farthest throw of short cut latch in second half of cycle, adjust eccentric to obtain .030" to .050" clearance between the short cut latch and the short cut release link.

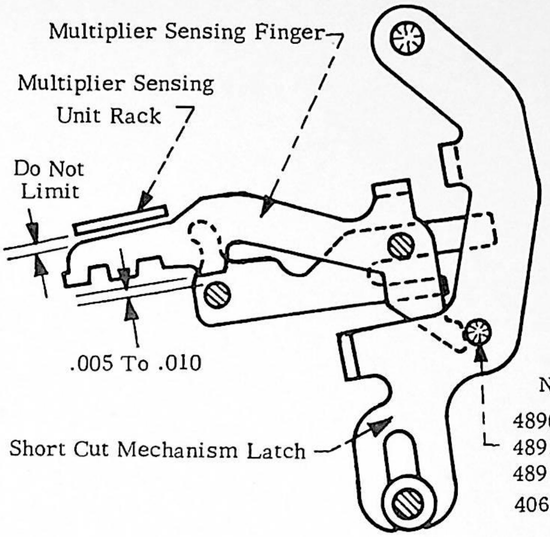
If unable to obtain enough clearance re-check Adj. 58.



ADJ. 64 MULTIPLIER SENSING FINGER ADVANCE

The multiplier sensing finger to have a safe clearance .005" to .010" of the mechanism latch stud to insure the multiplier sensing finger advance on a short cut operation.

Place the machine in home position (0°), select number 9 in the selection unit, depress the squaring key, cycle the machine one complete cycle, depress the equals key, cycle the machine to 180°, adjust by using interchangeable rollers if needed, (See Note) to achieve a safe clearance .005" to .010" of the stud that extends through the short cut mechanism latch and the multiplier sensing finger, caution do not limit the multiplier sensing finger against the multiplier counter basket, secure roller with clip, cycle the machine to complete equals operation.

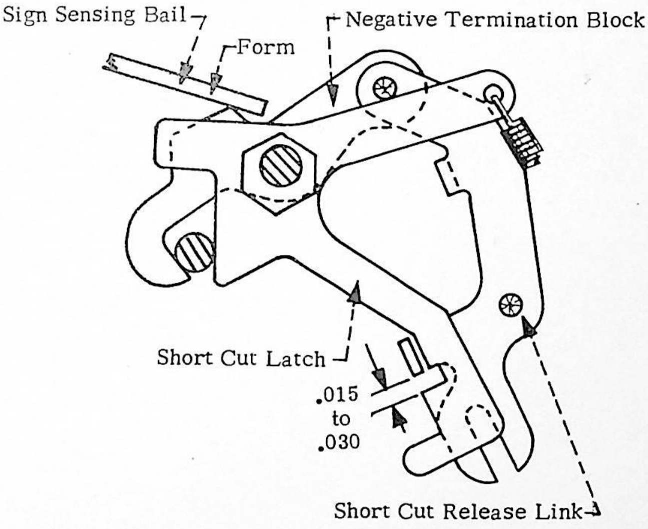

Multiplier Sensing Finger
Multiplier Sensing Unit Rack
Do Not Limit
.005 To .010
Short Cut Mechanism Latch

NOTE:

4890	.125
4891	.140
4892	.156
4060	clip

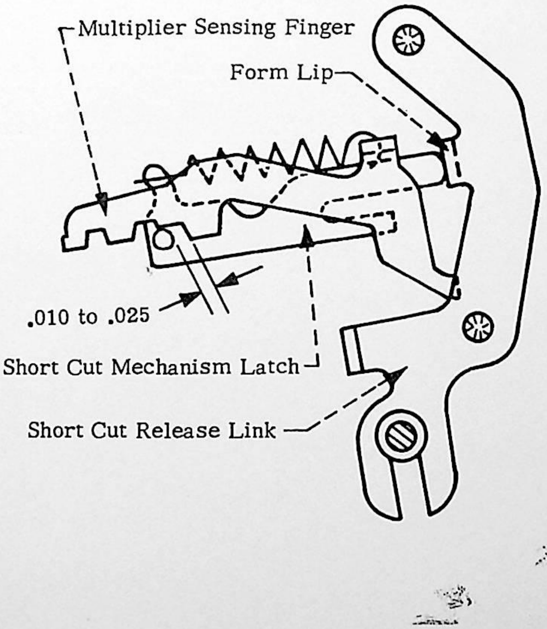
ADJ. 65 SHORT CUT LATCHING

Place machine in home position. Select number 99, depress squaring key, cycle machine one complete cycle, depress equals key, do not cycle machine, form tail of sign sensing bail to obtain .015" to .030" overstroke of the short cut latch by the short cut release link. Then cycle machine to 320° of first machine cycle, short cut release link should have same overtravel. If not re-check 51 and 52.



ADJ. 66 SHORT CUT LATCH MECHANISM

Place machine in home position, select number 1, depress the squaring key, cycle machine one complete cycle. Depress the equals key, cycle machine to 180°, adjust by forming the lip on the short cut release link to obtain .010" to .025" clearance between the stud that extends through short cut mechanism latch and multiplier sensing finger.



ADJ. 67 MULT OVER CAPACITY SENSING

FIG.1

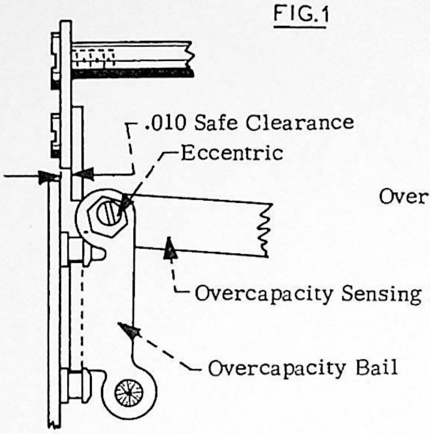
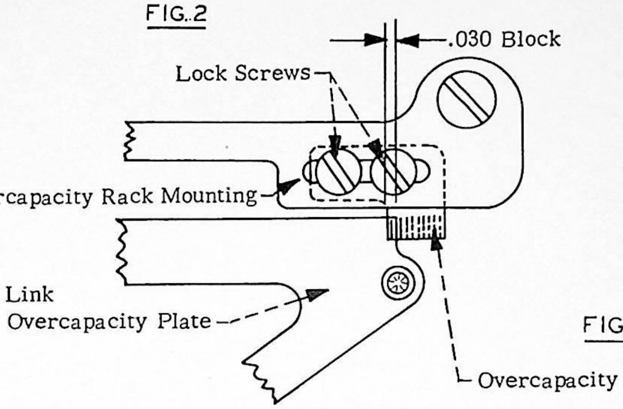


FIG.2



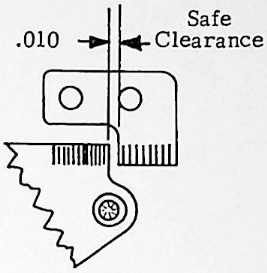


FIG.3

FIG. 1 OVERCAPACITY BAIL

With machine in home position select nine numbers. Depress X^2 key, cycle machine one complete cycle. Loosen lock screws, turn eccentric to obtain a safe clearance between the overcapacity sensor plate and the overcapacity sensor block.

FIG. 2 OVERCAPACITY PLATE ENGAGEMENT

Depress backspace key, cycle machine one complete cycle, loosen two lock screws. Adjust by sliding the overcapacity sensor block to obtain .030" engagement with the overcapacity plate, tighten lock screws. Depress equals key, equals slide should not be released.

Cycle machine one complete cycle, this should be a backspace operation if proper blocking has occurred.

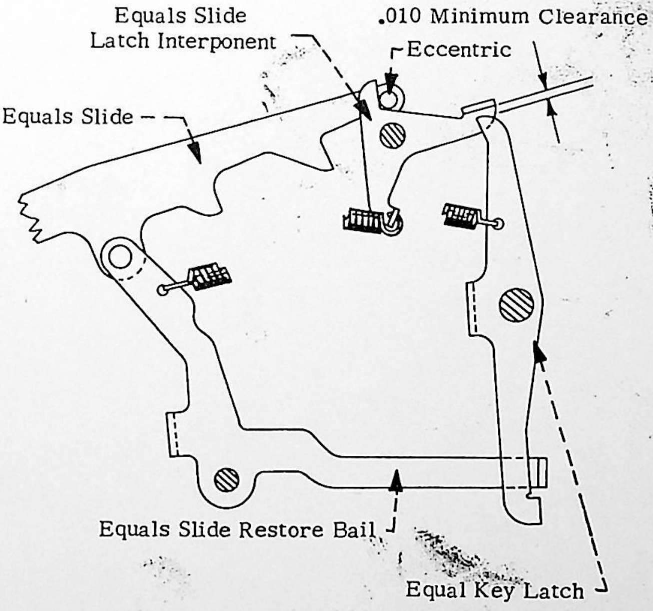
FIG. 3 OVERCAPACITY SENSING BLOCK CLEARANCE

The overcapacity sensing block should now have safe clearance to the overcapacity plate. Depress equals key, the equals slide should now be released and an equals operation initiated.

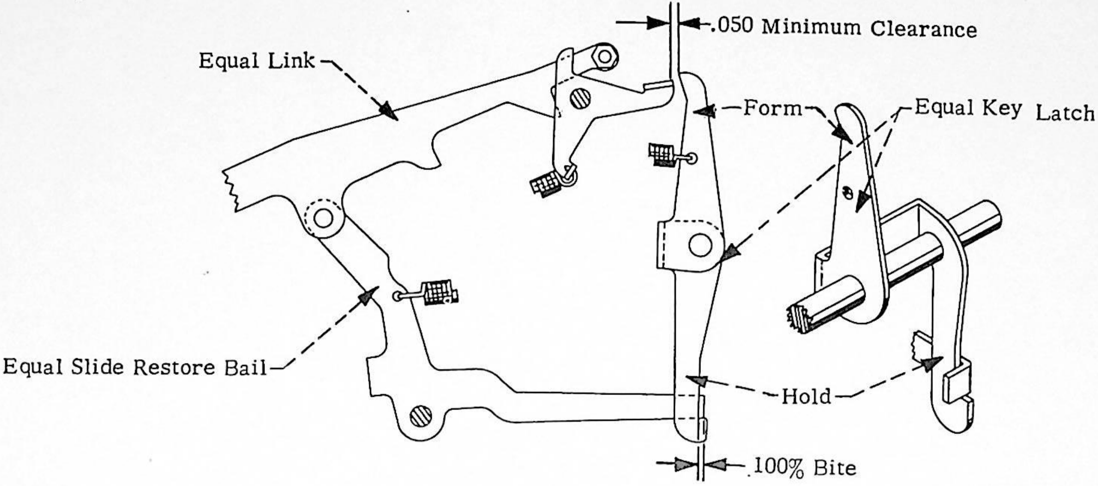
ADJ. 68 EQUALS SLIDE INTERPONENT BELLCRANK LATCH

The equals slide latch interponent to have .010" minimum clearance of the equals key latch.

Place the machine in home position (0°) on degree gear, select number one in the selection unit, depress the times key, cycle the machine one complete cycle, select number one in the selection unit, depress the equals key, cycle the machine one complete cycle, then cycle to 70°, loosen the lock nut, turn the eccentric to achieve .010" minimum clearance between the equals slide latch interponent and the equals key latch, tighten the lock nut, cycle the machine to complete the equals operation.



ADJ. 69 EQUALS KEY LATCH



Clearance between equals slide interponent and equals key latch should be as wide as possible, with a minimum of .050". Equals slide must fire with or before clutch releasing.

Place machine in home position, use two forming tools, hold lower part of equals key latch, form upper part, tap lightly on equals key until equals slide fires, checking for equals slide to fire with or before clutch releasing.

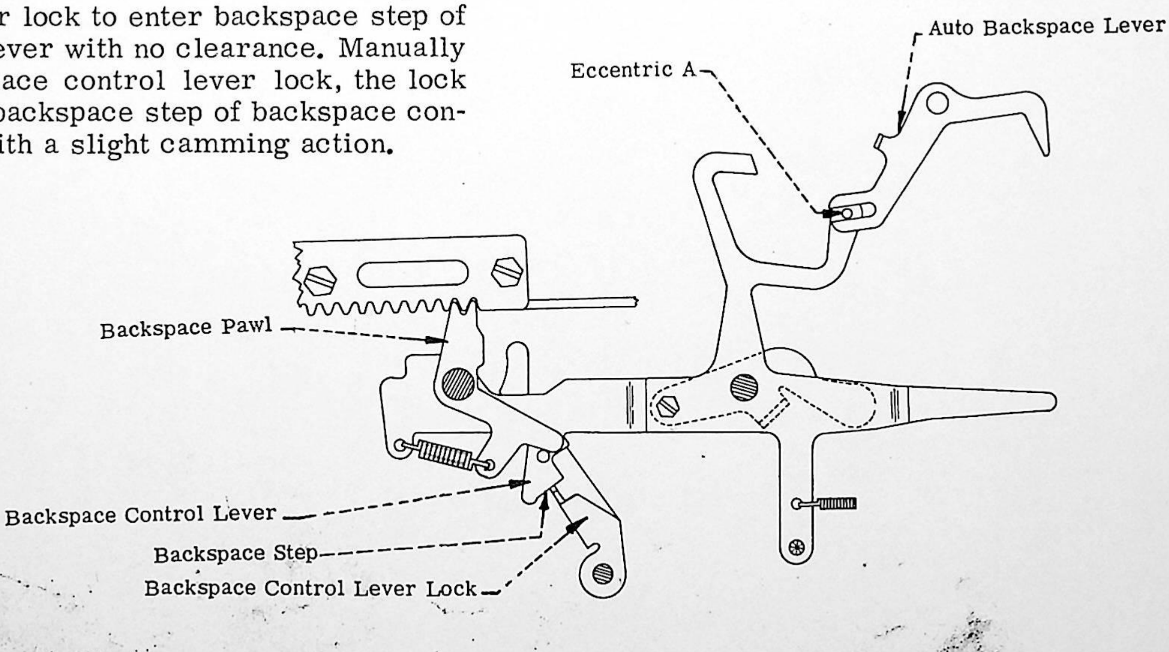
Select 12 numbers, depress squaring key, cycle machine one complete cycle, depress equals key, cycle one cycle, machine is in over capacity and should backspace, repeat 7 more times checking equals keylatch to retain 100% bite on equals slide restore bail.

Depress equals key one more time equals slide should fire.

ADJ. 70 OVERCAPACITY AUTOMATIC BACKSPACE ARM

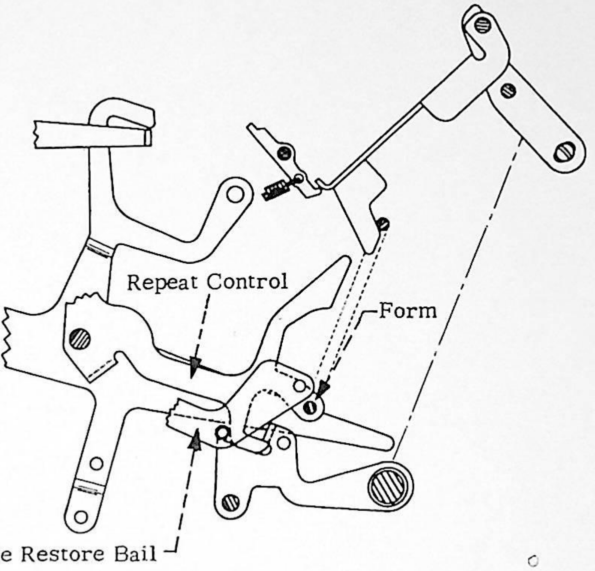
Select 9 numbers depress squaring key, cycle one complete cycle. Depress equals key, cycle machine to 60^0. Adjust eccentric A on backspace control lever to allow backspace control lever lock to enter backspace step of backspace lever with no clearance. Manually rock backspace control lever lock, the lock must enter backspace step of backspace control lever with a slight camming action.

Note: Adjustment of eccentric should not limit the counterclockwise movement of the backspace control lever.



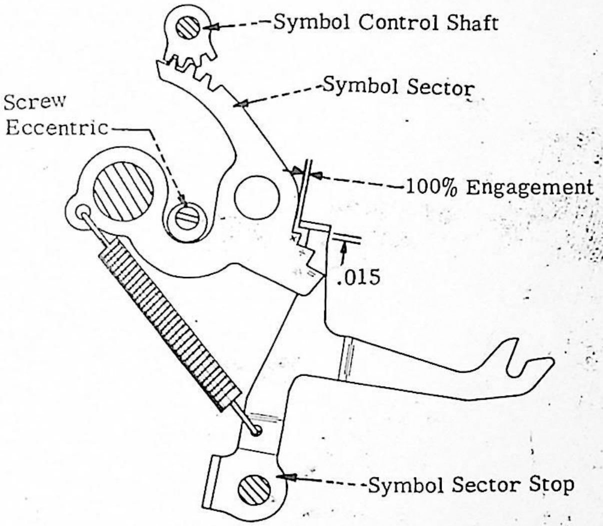
ADJ. 71 REPEAT BAILS - EQUALS

Place machine in home position (0°), select one number in selection unit. Depress squaring key, cycle machine one complete cycle. Depress equals key, if needed form repeat control in area of stud to have repeat bails to block zero latches. Cycle machine to complete equals operation. Recheck Adjustment 26.



ADJ. 72 TIMES DIVISION EQUALS NEG. EQUALS SYMBOL STOP

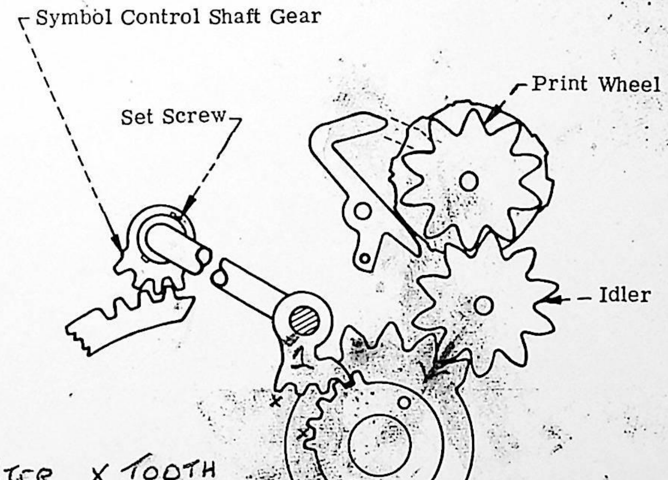
Place the machine in home position (0°), loosen the lock screw, hold the symbol sector rearward with a screwdriver, turn the eccentric to achieve a .015" clearance as shown between the first step on the symbol sector and the symbol sector stop, tighten the lock screw, if needed form lip on symbol stop for 100% engagement.



ADJ. 73 SYMBOL CONTROL SHAFT

Depress "X" key, cycle machine until print wheel is released to print. Rock print arm back down. The tooth on the idler gear must mesh with the tooth space in the block drum gear without moving the gear. To adjust loosen set screw and move the gear.

Check by depressing the negative equals key. The print wheel must be rotated far enough to position the negative equals symbol properly.



TO TIME GEARS.

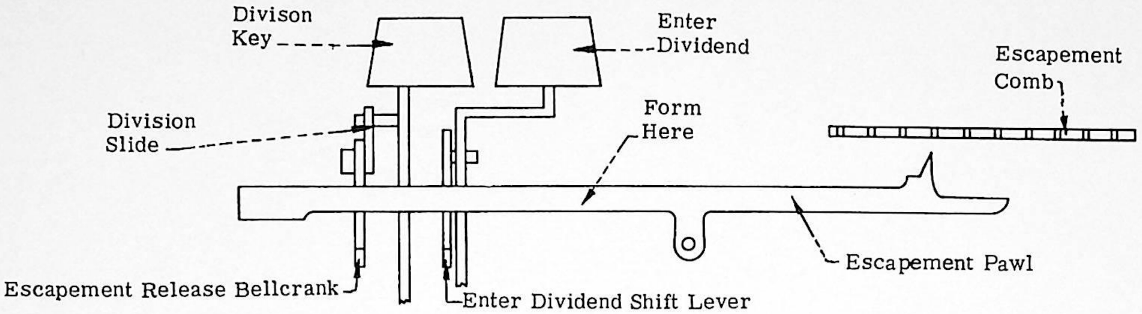
STEP #1 - LOOSEN SET SCREWS

STEP #2 - PULL GEAR #1 UP AND ENTER X TOOTH WITH X VALLEY

STEP #3 - MAKE SURE IDLER ENTERS TOOTH IN BLOCK DRUM GEAR IN PRINT POSITION

STEP #4 - TIGHTEN SET SCREWS.

ADJ. 74 SELECTION CARRIAGE ESCAPEMENT-ENTER DIVIDEND DIVISION



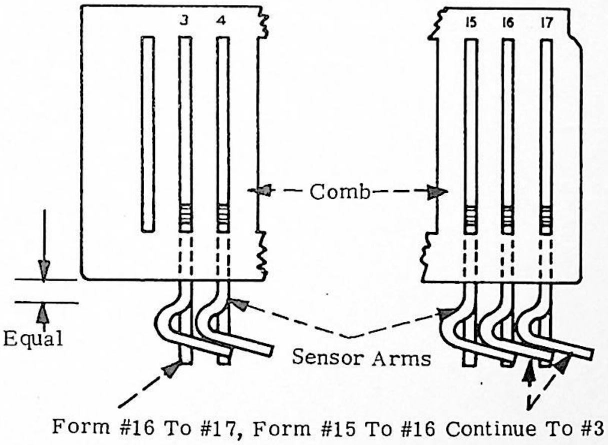
Select one number. Depress the enter dividend key fully while restricting the leftward movement of the carriage. There should be a safe clearance between the tooth of the escapement pawl and the escapement comb. If necessary form the left end of the escapement pawl, as shown.

Select number 1, depress the enter dividend key, cycle machine one cycle. Select number 1 depress division key very hard and fast. The escapement pawl must not bounce out of engagement with the escapement comb. Cycle machine until carriage shifts to the sixteenth column. There should be a safe clearance between the escapement pawl and the escapement comb. If necessary form the left end of the escapement pawl as shown. Re-check enter dividend key.

ADJ. 75 DIVISION SENSOR ARMS ALIGNMENT

The division sensor arms to be aligned in comb.

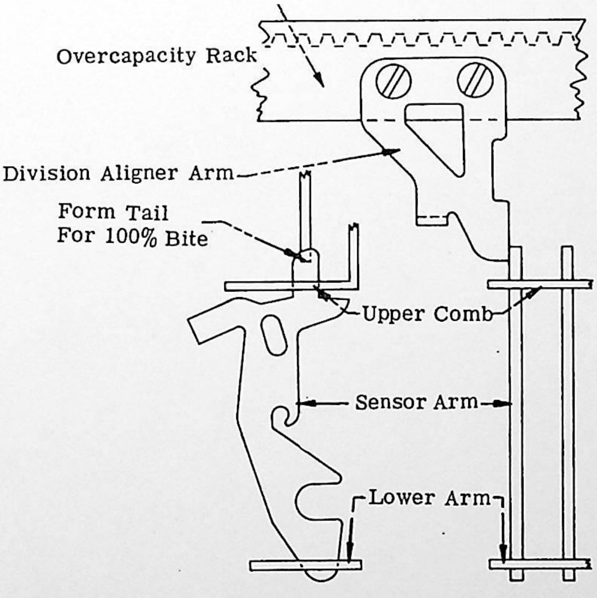
Place the machine in home position (0^0), using #17 accumulator sensor arm as a guide, form tail of #16 sensor arm to align in comb with #17 sensor arm, form tail of #15 sensor arm to align with #16 sensor arm, continue to #3 sensor arm.



Form #16 To #17, Form #15 To #16 Continue To #3

ADJ. 76 DIVISION ALIGNMENT STOP

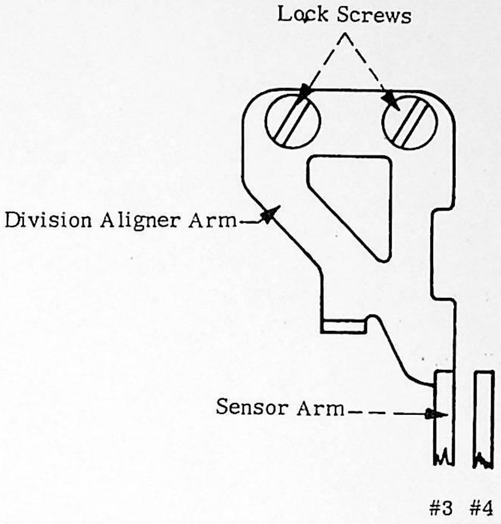
With the accumulator conditioned for a positive total, place the machine in home position (0^0), depress the total key, cycle the machine one complete cycle, manually rock the accumulator sensor arm bail forward and hold, select ~~one~~ 2 number in the selection unit, adjust by forming tail of the division aligner arm to have 100% bite of the third column arm.



ADJ. 77 DIVISION ALIGNMENT STOP OVERTRAVEL

The division aligner arm to be even with sensor arms in each position.

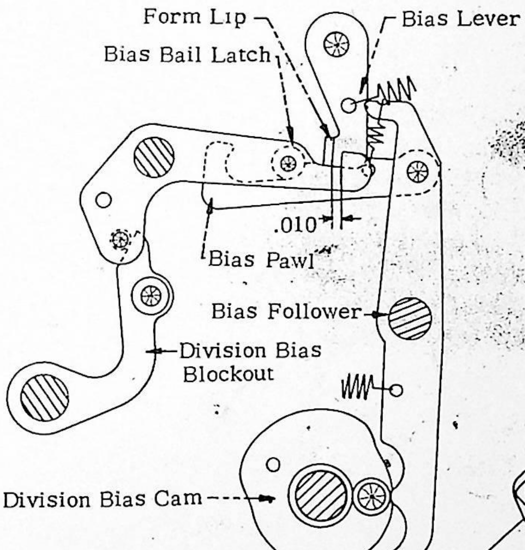
Select 2 numbers in selection unit, loosen the lock screws, adjust by sliding the division alignment stop to be approximately with #3 sensor arm.



ADJ. 78 DIVISION COUNTER BIAS BAIL LATCHING

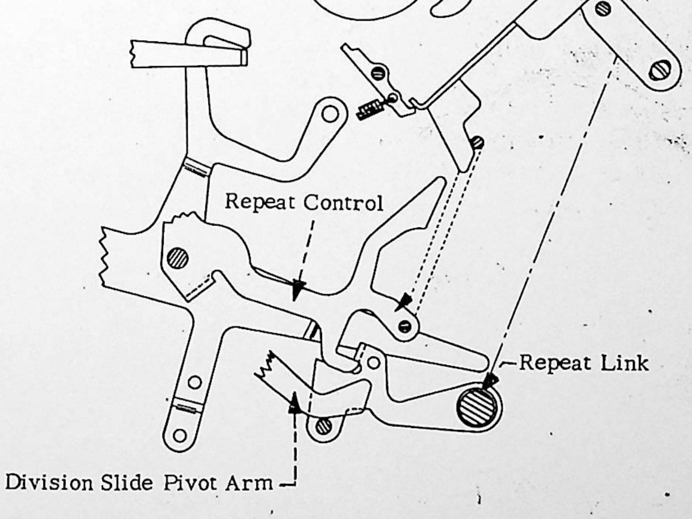
Place the machine in home position (0°), select number 1 in the selection unit, depress the enter dividend key, cycle the machine one complete cycle, select number 1 in the selection unit, depress the division key, cycle the machine two complete cycles, then cycle to 160°, adjust by forming the lip on division bias bail lever to have .010" safe clearance of the bias bail latch, cycle the machine to complete the division operation.

When latched, counter tooth must have good engagement with memory sectors, if not recheck Adj. 60.



ADJ. 79 REPEAT BAILS - DIVISION

Place machine in home position, select one number in selection unit. Depress enter-dividend key, cycle machine one complete cycle. Select one number in selection unit, depress division key. If needed form division slide pivot arm in area of stud on repeat link to have repeat bails block zero latches, cycle machine to complete division operation.



ADJ. 80 MICRO SWITCHES - SEQUENCE MUST BE FOLLOWED

FIG. 1 MOTOR STARTING

With power on, hold the switch link and depress non add key. Let the switch link come forward slowly. The motor should start before the clutch engages. Adjust by forming switch blade.

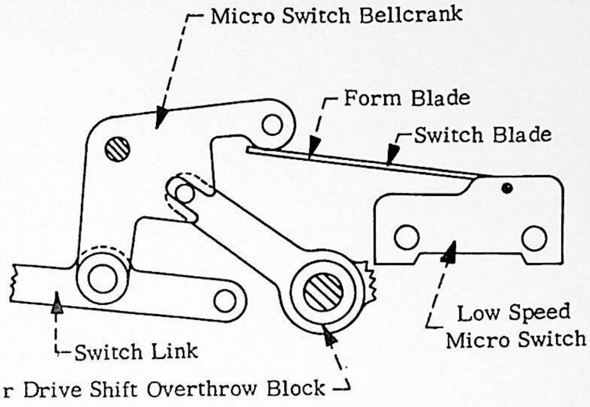


FIG. 1

FIG. 2 HIGH SPEED SWITCH-DIVISION

Clear the accumulator. Select Fig. 2 in selection unit. Depress enter dividend key, cycle machine one complete cycle. Select a '2' in selection unit, depress division key. Cycle machine one complete cycle, then cycle to 290°. High speed micro switch must close, if needed form high speed micro switch blade. Continue cycling machine to 360° of the fifth cycle. High speed micro switch must open, if needed form high speed micro switch blade.

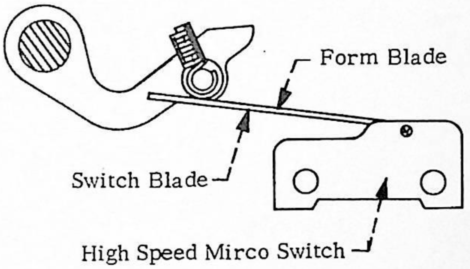


FIG. 2

FIG. 3 HIGH SPEED SWITCH-EQUALS

Select a '2' in selection unit. Depress squaring key, cycle machine one complete cycle. Depress equals key, cycle machine to 285°. High speed micro switch must close, if needed form lip on switch operating lever. Cycle machine to 160° of second cycle. High speed micro switch must open, if needed form lip on switch operating lever.

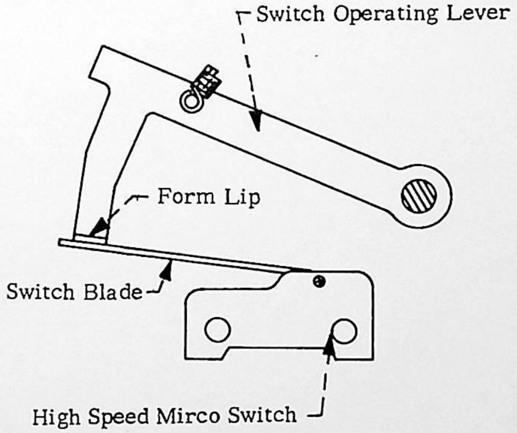
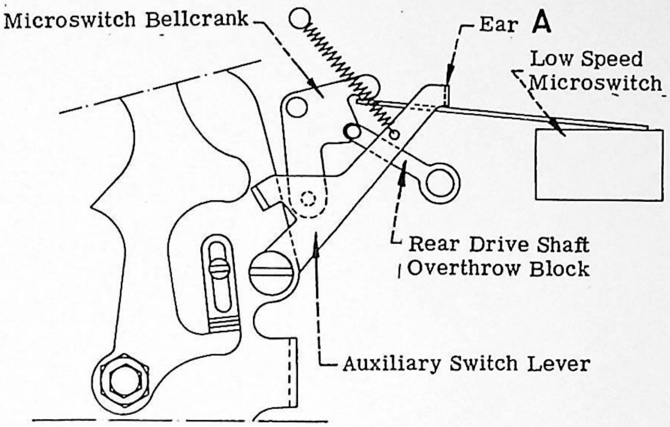


FIG. 3

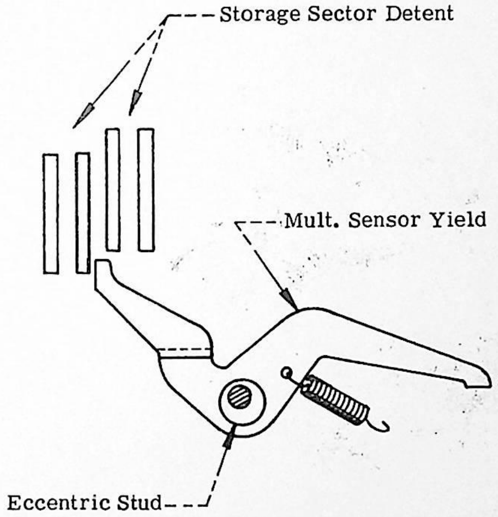
ADJ. 81 AUXILIARY SWITCH LEVER



Depress non-add key cycle machine to 300°. Continue to cycle the machine slowly, as the microswitch bellcrank releases the blade of the microswitch the auxiliary switch lever must hold the microswitch closed. If necessary form ear A. CAUTION: Do not allow the auxiliary switch lever to force the microswitch blade against the rear drive shaft overthrow block.

To test operate the machine by hand until the microswitch bellcrank just releases the microswitch blade. Attach power, motor should start and drive machine to home position.

ADJ. 82 MULT. SENSOR YIELD



Select two 1's. Depress "x" key. Cycle machine one cycle. Mult. sensor yield must clear storage sector detents in zero (up) position and solidly contact detents which are in selected (down) position. Adjust eccentric stud as required.

```
                                 .00 T

REPEAT,MINUS                     .02 -
                                 .20 -
                                2.00 -
                               20.00 -
                              200.00 -
                            2,000.00 -
                           20,000.00 -
                          200,000.00 -
                        2,000,000.00 -
                       20,000,000.00 -
REPEAT ADD,            20,000,000.00 +
BACK SPACE              2,000,000.00 +
                          200,000.00 +
                           20,000.00 +
                            2,000.00 +
                              200.00 +
                               20.00 +
                                2.00 +
                                 .20 +
                                 .02 +
                                 .00 S̄

                                 .00 T̄

                                 .00 T̄

ADD                             1.23 +
NON ADD                         1.23 #
SUB TOTAL                       1.23 S

TOTAL                           1.23 T

                                 .00 T

                                4.56 +
                                4.56 #
                                4.56 S

                                4.56 T

                                 .00 T

                                7.89 +
                                7.89 #
                                7.89 S

                                7.89 T

                                 .00 T

MINUS                           1.23 -
NON ADD                         1.23 #
SUB TOTAL                       1.23 S̄

TOTAL                           1.23 T̄
```

```
                                 .00 T̄

MINUS             99,999,999.99 -
                            .01 -
SUB TOTAL        100,000,000.00 S̄

ADD                         .01 +
SUB TOTAL         99,999,999.99 S̄

MINUS                       .01 -
SUB TOTAL        100,000,000.00 S̄

                            .01 +
                  99,999,999.99 S̄

                            .01 -
                 100,000,000.00 S̄

                            .01 +
                  99,999,999.99 S̄

                            .01 -
                 100,000,000.00 S̄

                            .01 +
                  99,999,999.99 S̄

                            .01 -
                 100,000,000.00 S̄

TOTAL            100,000,000.00 T̄

                            .00 T̄

ADD               99,999,999.99 +
                            .01 +
SUB TOTAL        100,000,000.00 S

MINUS                       .01 -
SUB TOTAL         99,999,999.99 S

                            .01 +
                 100,000,000.00 S

                            .01 -
                  99,999,999.99 S

                            .01 +
                 100,000,000.00 S

                            .01 -
                  99,999,999.99 S

                            .01 +
                 100,000,000.00 S

TOTAL            100,000,000.00 T

                            .00 T
```

PRINTING CALCULATOR ADJUSTMENTS

TEST PROBLEMS

```
ADD                            .01 +
MINUS                          .02 -
                               .03 +
                               .04 -
                               .05 +
                               .06 -
                               .07 +
                               .08 -
                               .09 +
SUB TOTAL                      .05 S

TOTAL                          .05 T

                               .00 T

MINUS                          .01 -
ADD                            .02 +
                               .03 -
                               .04 +
                               .05 -
                               .06 +
                               .07 -
                               .08 +
                               .09 -
SUB TOTAL                      .05 S̄

TOTAL                          .05 T̄

                               .00 T̄

ADD              12,345,678.91 +
                 23,456,789.12 +
                 34,567,891.23 +
                 45,678,912.34 +
                 56,789,123.45 +
                 67,891,234.56 +
                 78,912,345.67 +
                 89,123,456.78 +
                 91,234,567.89 +
SUB TOTAL       499,999,999.95 S

MINUS            12,345,678.91 -
                 23,456,789.12 -
                 34,567,891.23 -
                 45,678,912.34 -
                 56,789,123.45 -
                 67,891,234.56 -
                 78,912,345.67 -
                 89,123,456.78 -
                 91,234,567.89 -
SUB TOTAL                  .00 S

TOTAL                      .00 T
```

```
ADD       19,191,919.19 +
          91,919,191.91 +
         111,111,111.10 S

         111,111,111.10 T

                    .00 T

MINUS     19,191,919.19 -
          91,919,191.91 -
         111,111,111.10 S̄

         111,111,111.10 T̄

                    .00 T̄

          91,919,191.91 -
          19,191,919.19 -
         111,111,111.10 S̄

         111,111,111.10 T̄

                    .00 T̄

ADD       10,000,000.00 +
          11,111,111.11 +
          22,222,222.22 +
          33,333,333.33 +
          44,444,444.44 +
          55,555,555.55 +
          66,666,666.66 +
          77,777,777.77 +
          88,888,888.88 +
          99,999,999.99 +
         509,999,999.95 S

         509,999,999.95 T

                    .00 T

MINUS     10,000,000.00 -
          11,111,111.11 -
          22,222,222.22 -
          33,333,333.33 -
          44,444,444.44 -
          55,555,555.55 -
          66,666,666.66 -
          77,777,777.77 -
          88,888,888.88 -
          99,999,999.99 -
         509,999,999.95 S̄

         509,999,999.95 T̄

                    .00 T̄
```

```
ADD      19,191,919.19 +
         91,919,191.91 +
        111,111,111.10 S

        111,111,111.10 T

                   .00 T

         91,919,191.91 +
         19,191,919.19 +
        111,111,111.10 S

        111,111,111.10 T

                   .00 T

MINUS    19,191,919.19 -
         91,919,191.91 -
        111,111,111.10 S̄

        111,111,111.10 T̄

                   .00 T̄

         91,919,191.91 -
         19,191,919.19 -
        111,111,111.10 S̄

        111,111,111.10 T̄

                   .00 T̄

ADD      99,999,999.99 +
                   .01 +
        100,000,000.00 S

        100,000,000.00 T

                   .00 T
MINUS    99,999,999.99 -
                   .01 -
        100,000,000.00 S̄

        100,000,000.00 T̄

                   .00 T̄
```

```
x²                            111,111.11 #   X
ACCUM =                       111,111.11     =
     1,234,567,876,543.21 S

DIV.                          111,111.11 #   ÷
                              111,111.11 #   ÷

                              222,222.22 #   X
                              222,222.22     =
     4,938,271,506,172.84 S

                              222,222.22 #   ÷
                              222,222.22 #   ÷

                              333,333.33 #   X
                              333,333.33     =
    11,111,110,888,888.89 S

                              333,333.33 #   ÷
                              333,333.33 #   ÷

                              444,444.44 #   X
                              444,444.44     =
    19,753,086,024,691.36 S

                              444,444.44 #   ÷
                              444,444.44 #   ÷

                              555,555.55 #   X
                              555,555.55     =
    30,864,196,913,580.25 S

                              555,555.55 #   ÷
                              555,555.55 #   ÷

                              666,666.66 #   X
                              666,666.66     =
    44,444,443,555,555.56 S

                              666,666.66 #   ÷
                              666,666.66 #   ÷

                              777,777.77 #   X
                              777,777.77     =
    60,493,825,950,617.29 S

                              777,777.77 #   ÷
                              777,777.77 #   ÷

                              888,888.88 #   X
                              888,888.88     =
    79,012,344,098,765.44 S

                              888,888.88 #   ÷
                              888,888.88 #   ÷

                              999,999.99 #   X
                              999,999.99     =
    99,999,998,000,000.01 S

                              999,999.99 #   ÷
                              999,999.99 #   ÷
```

```
x²                               .12 #  X
ACCUM =                          .12    =
                                1.44 S

DIV.                             .12 #  ÷
                                 .12 #  ÷

                                 .25 #  X
                                 .25    =
                                6.25 S

                                 .25 #  ÷
                                 .25 #  ÷

                                 .36 #  X
                                 .36    =
                               12.96 S

                                 .36 #  ÷
                                 .36 #  ÷

                                 .47 #  X
                                 .47    =
                               22.09 S

                                 .47 #  ÷
                                 .47 #  ÷

                                 .58 #  X
                                 .58    =
                               33.64 S

                                 .58 #  ÷
                                 .58 #  ÷

                                 .69 #  X
                                 .69    =
                               47.61 S

                                 .69 #  ÷
                                 .69 #  ÷

x²                        123,456.78 #  X
ACCUM =                   123,456.78    =
          1,524,157,652,796.84 S

NEG =                     123,456.78    ≡
                                 .00 T

                          191,919.19 #  X
                          919,191.91    =
         17,641,056,682,175.29 S

                          919,191.91    ≡
                                 .00 T
```

```
x²
                              123.45 #  X
TRANSFER =                    123.45    =
                        1,523,990.25 T  X

FROM MEMORY,ADD         1,523,990.25 +  X

DIV.                          123.45 #  ÷
                              123.45 #  ÷
--------------------------------------------
                              234.56 #  X
                              234.56    =
                        5,501,839.36 T  X

                        5,501,839.36 +  X

                              234.56 #  ÷
                              234.56 #  ÷
--------------------------------------------
x²
ACCUM =                       345.67 #  X
                              345.67    =
                       11,948,774.89 S

NEG =                         345.67    ≡
                                 .00 T
--------------------------------------------
                          888,888.88 #  X
                          888,888.88    =
       79,012,344,098,765.44 S

                          888,888.88    ≡
                                 .00 T
--------------------------------------------
NEG ACCUM =               888,888.88    ≡
       79,012,344,098,765.44 S̄

=                         888,888.88    =
                                 .00 T̄
--------------------------------------------
                            2,626.26 #  X
                            2,626.26    =
                     689,724,158.76 S

                            2,626.26    =
                   1,379,448,317.52 T

                            2,626.26    ≡
                     689,724,158.76 S̄

                            2,626.26    =
                                 .00 T̄
--------------------------------------------
x²
ACCUM =                     3,333.33 #  X
                            3,333.33    =
                   1,111,108,888.89 S

DIV.                        3,333.33 #  ÷
                            3,333.33 #  ÷
```

```
x²                        12.35 #   X
ACCUM =                   12.35     =
                      15,252.25 S

DIV.                      12.35 #   ÷
                          12.35 #   ÷
---------------------------------------
                      69,696.91 #   X
                      69,696.91     =
          485,765,926,354.81 S

                      69,696.91 #   ÷
                      69,696.91 #   ÷
---------------------------------------
                         258.69 #   X
                         258.69     =
                   6,692,051.61 S

                         258.69 #   ÷
                         258.69 #   ÷
---------------------------------------
                          10.85 #   X
                          10.85     =
                      11,772.25 S

                          10.85 #   ÷
                          10.85 #   ÷
---------------------------------------
                           7.25 #   X
                           7.25     =
                       5,256.25 S

                           7.25 #   ÷
                           7.25 #   ÷
---------------------------------------
x                           .12 #   X
ACCUM =                     .15     =
                           1.80 S

DIVISION                    .12 #   ÷
                            .15 #   ÷
---------------------------------------
                            .26 #   X
                            .35     =
                           9.10 S

                            .26 #   ÷
                            .35 #   ÷
---------------------------------------
                            .46 #   X
                            .64     =
                          29.44 S

                            .64 #   ÷
                            .46 #   ÷
```

```
x²                        269.83 #   X
ACCUM =                   269.83     =
                    7,280,822.89 S

DIVISION                  269.83 #   ÷
                          269.83 #   ÷
----------------------------------------
                            1.47 #   X
                            1.47     =
                          216.09 S

                            1.47 #   ÷
                            1.47 #   ÷
----------------------------------------
                            2.58 #   X
                            2.58     =
                          665.64 S

                            2.58 #   ÷
                            2.58 #   ÷
----------------------------------------
                            3.69 #   X
                            3.69     =
                        1,361.61 S

                            3.69 #   ÷
                            3.69 #   ÷
----------------------------------------
                      444,444.44 #   X
                      444,444.44     =
       19,753,086,024,691.36 S

                      444,444.44 #   ÷
                      444,444.44 #   ÷
----------------------------------------
```

TEST PROBLEMS

```
x²                          1,111.11 #   X
NEG,ACCUM =                 1,111.11     ≡
                      123,456,543.21 S̄

=                           1,111.11     =
                                 .00 T̄

                            2,222.22 #   X
                            2,222.22     ≡
                      493,826,172.84 S̄

                            2,222.22     =
                                 .00 T̄

                            3,333.33 #   X
                            3,333.33     ≡
                    1,111,108,888.89 S̄

                            3,333.33     =
                                 .00 T̄

                            4,444.44 #   X
                            4,444.44     ≡
                    1,975,304,691.36 S̄

                            4,444.44     =
                                 .00 T̄

                            5,555.55 #   X
                            5,555.55     ≡
                    3,086,413,580.25 S̄

                            5,555.55     =
                                 .00 T̄

                            6,666.66 #   X
                            6,666.66     ≡
                    4,444,435,555.56 S̄

                            6,666.66     =
                                 .00 T̄

                            7,777.77 #   X
                            7,777.77     ≡
                    6,049,370,617.29 S̄

                            7,777.77     =
                                 .00 T̄

                            8,888.88 #   X
                            8,888.88     ≡
                    7,901,218,765.44 S̄

                            8,888.88     =
                                 .00 T̄

                            9,999.99 #   X
                            9,999.99     ≡
                    9,999,980,000.01 S̄

                            9,999.99     =
                                 .00 T̄
```

```
X                              1,919.19 #   X  ,
ACCUM =                        9,191.91     =
                       1,764,102,175.29 S

DIV.                           1,919.19 #   ÷
                               9,191.91 #   ÷÷
------------------------------------------------
                               2,828.28 #   X
                               8,282.82     =
                       2,342,613,414.96 S

                               2,828.28 #   ÷
                               8,282.82 #   ÷÷
------------------------------------------------
                               4,646.46 #   X
                               6,464.64     =
                       3,003,769,117.44 S

                               6,464.64 #   ÷
                               4,646.46 #   ÷÷
------------------------------------------------
TO MEMORY,ADD                  1,111.11 +   X
ACCUM =                        1,111.11     =
                         123,457,654.32 S

                               1,111.11 -
MINUS                          1,111.11 #   ÷
DIVISION                       1,111.11 #   ÷÷
------------------------------------------------
                               2,222.22 +   X
                               2,222.22     =
                         493,828,395.06 S

                               2,222.22 -
                               2,222.22 #   ÷
                               2,222.22 #   ÷÷
------------------------------------------------
X                            737,373.73 #   X
ACCUM =                      373,737.37     =
                  27,558,411,855,729.01 S

DIV.                         373,737.37 #   ÷
                             737,373.73 #   ÷÷
------------------------------------------------
                             828,282.82 #   X
                             282,828.28     =
                  23,426,180,533,414.96 S

                             282,828.28 #   ÷
                             828,282.82 #   ÷÷
------------------------------------------------
                             464,646.46 #   X
                             646,464.64     =
                  30,037,750,649,117.44 S

                             646,464.64 #   ÷
                             464,646.46 #   ÷÷
```

```
x                      888,888.88#    X
ACCUM=                 888,888.88     =
 79,012,344,098,765.44S

DIVISION               888,888.88#    ÷
                       888,888.88#    ÷
---------------------------------------
ACCUM=                 888,888.88     =
 79,012,344,098,765.44S

DIVISION               888,888.88#    ÷
                       888,888.88#    ÷
---------------------------------------
x           9,999,999,999.99#    X
ACCUM=                 55.55     =
 55,549,999,999,944.45S

DIV.        9,999,999,999.99#    ÷
                       55.55#    ÷
---------------------------------------
x                        .14#    X
ACCUM=                   .15     =
                        2,10S

DIVISION                 .15#    ÷
                         .14#    ÷
---------------------------------------
                        2.82#    X
                        3.69     =
                    1,040.58S

                        3.69#    ÷
                        2.82#    ÷
---------------------------------------
                         .46#    X
                         .25     =
                       11.50S

                         .25#    ÷
                         .46#    ÷
---------------------------------------
x                        .25#    X
=                        .85     =
                       21.25T
```

```
x           .01#    X
=           .01     =
            .01T

=           .02     =
            .02T

=           .03     =
            .03T

            .04     =
            .04T

            .05     =
            .05T

            .06     =
            .06T

            .07     =
            .07T

            .08     =
            .08T

            .09     =
            .09T

NEG=        .01     ≡
            .01T̄

            .02     ≡
            .02T̄

            .03     ≡
            .03T̄

            .04     ≡
            .04T̄

            .05     ≡
            .05T̄

            .06     ≡
            .06T̄

            .07     ≡
            .07T̄

            .08     ≡
            .08T̄

            .09     ≡
            .09T̄
```

TEST PROBLEMS

```
x^2                               .25 #     X
NEG =                             .25       ≡
                                 6.25 T̄

                                  .36 #     X
                                  .36       ≡
                                12.96 T̄

                                  .47 #     X
                                  .47       ≡
                                22.09 T̄

                                  .58 #     X
                                  .58       ≡
                                33.64 T̄

                                  .69 #     X
                                  .69       ≡
                                47.61 T̄

                                  .00 T̄

                                  .00 S̄

                                  .00 T̄

x^2                        123,456.78 #     X
TRANSFER =                 123,456.78       =
              1,524,157,652,796.84 T        X

FROM MEMORY, ADD 1,524,157,652,796.84 +     X

NEG =                             .01       ≡
                                  .00 T

x^2                          2,222.22 #     X
TRANSFER =                   2,222.22       =
                       493,826,172.84 T     X

FROM MEMORY, ADD       493,826,172.84 +     X

DIV.                         2,222.22 #     ÷
                             2,222.22 #     ÷

                             3,333.33 #     X
                             3,333.33       =
                     1,111,108,888.89 T     X

                     1,111,108,888.89 +     X

                             3,333.33 #     ÷
                             3,333.33 #     ÷
```

```
X                            8,282.82 #     X
TRANSFER =                   2,828.28       =
                 2,342,613,414.96 T         X

FROM MEMORY, ADD 2,342,613,414.96 +         X

DIV.                         2,828.28 #     ÷
                             8,282.82 #     ÷

                             9,191.91 #     X
                             1,919.19       =
                 1,764,102,175.29 T         X

                 1,764,102,175.29 +         X

                             1,919.19 #     ÷
                             9,191.91 #     ÷

X                                1.23 #     X
ACCUM =                         58.96       =
                             7,252.08 S

DIV.                            58.96 #     ÷
                                 1.23 #     ÷

                                 2.59 #     X
                                48.96       =
                             12680.64 S

                                48.96 #     ÷
                                 2.59 #     ÷

X                                 .25 #     X
=                               58.00       =
                             1,450.00 T

                                  .25 #     X
                                58.00       =
                             1,450.00 T
```

```
X                        .12 #    X
ACCUM TRANSFER =       12.12      =
                      145.44 S    X

FROM MEMORY,MINUS     145.44 -    X

                         .00 S

                         .00 T

                         .25 #    X
                       25.25      =
                      631.25 S    X

                      631.25 -    X

                         .00 S

                         .00 T

                         .68 #    X
                       68.68      =
                    4,670.24 S    X

                    4,670.24 -    X

                         .00 S

                         .00 T

                         .89 #    X
                       89.89      =
                    8,000.21 S    X

                    8,000.21 -    X

                         .00 S

                         .00 T
```

```
ADD              1,000,000,000.00 +
DIV.                          .01 #    ÷
                 1,000,000,000.00 #    ÷

ENTER DIV.14,400,000,000,000.00 +
DIV.                          .12 #    ÷
              1,200,000,000,000.00 #    ÷

            25,800,000,000,000.00 +
                              .02 #    ÷
            12,900,000,000,000.00 #    ÷

            48,000,000,000,000.00 +
                              .12 #    ÷
             4,000,000,000,000.00 #    ÷

            90,000,000,000,000.00 +
                              .01 #    ÷
            90,000,000,000,000.00 #    ÷

            12,345,678,000,000.00 +
                       999,999.99 #    ÷
                       123,456.78 #    ÷

            33,333,300,000,000.00 +
                              .33 #    ÷
             1,010,100,000,000.00 #    ÷

            90,000,000,000,000.00 +
                              .01 #    ÷
            90,000,000,000,000.00 #    ÷

            25,000,000,000,000.00 +
                              .05 #    ÷
             5,000,000,000,000.00 #    ÷

            14,500,000,000,000.00 +
                              .12 #    ÷
             1,208,333,333,333.33 #    ÷

            25,000,000,000,000.00 +
                              .12 #    ÷
             2,083,333,333,333.33 #    ÷

            15,000,000,000,000.00 +
                              .12 #    ÷
             1,250,000,000,000.00 #    ÷
```